Medical Lib.

Registered at the G.P.O., Sydney, for Transmission by Post as a Newspaper. Published Weekly. Price 1s.

THE MEDICAL JOURNAL OF AUSTRALIA

CONGRESS NUMBER

VOL. II.—16TH YEAR. SYDNEY, SATURDAY, OCTOBER 5, 1929. No. 14.

Dependable——
Stainless Instruments

The best "Stainless" Steel now produced combines the durability, strength, flexibility and keenness of well tempered shear steel with the resistance to corrosion of platinum. After experiments and tests extending over several years, Allen & Hanburys Ltd. are now manufacturing from this alloy steel a large number of such instruments as scissors, scalpels, needle-holders, clamps, bougies and forceps of most varieties in general use. Each of them is hand forged and an example of sound design, thorough British craftsmanship and fine finish.

Instruments made from this "Stainless" Steel retain their cutting edges and beautiful finish; they are easily cleaned and sterilized, and are proof against rust and corrosion; with fair use they will give a lifetime of service, without need for repairs or re-polishing.

"Stainless" Instruments are steadily and surely replacing nickel-plated and other instruments made from carbon steel.

An illustrated booklet on the "Stainless" Steel Instruments of our manufacture at present available will gladly be sent on application.

Surgeons are cordially invited to call and inspect our stock.

ALLEN & HANBURYS (Australasia) LTD.

41 HUNTER STREET, SYDNEY, N.S.W.

PEAPES' SUPLEX COLLARS

1/3 each 14/6 a dozen

These collars have attained to great popularity because while as comfortable as a soft collar, they are always neat and smart.

"SUPLEX" Collars are not semi-stiff nor semi-soft. They are fully starched, but quite FLEXIBLE.

In five smart shapes and quarter sizes.

Round corners, $1\frac{1}{2}$ inches deep, or with 2, $2\frac{1}{4}$ or $2\frac{3}{8}$ inches square points.

PEAPES

— for men AND their sons

GEORGE STREET

OPP. HUNTER STREET

SYDNEY

Write for Peapes' new Catalogue, just issued.

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—16TH YEAR. SYDNEY, SATURDAY, OCTOBER 5, 1929. No. 14.

Authors of articles submitted for publication are requested to read the following instructions and to comply with them.

All articles must be typed with double or treble spacing. Carbon copies should not be sent. Abbreviations should be avoided, especially those of a technical character at times employed in ward notes. Words and sentences should not be underlined or typed in capitals. The selection of the correct type is undertaken by the Editors. When illustrations are required, good photographic prints on glossy gaslight papers should be submitted. Each print should be enclosed in a sheet of paper. On this sheet of paper the number of the figure and the legend to appear below the print should be typed or legibly written. On no account should any mark be made on the back of the photographic print. If no good print is available, negatives may be submitted. Line drawings, graphs, charts and the like should be drawn on thick, white paper in India ink by a person accustomed to draw for reproduction. The drawings should be large and boldly executed and all figures, lettering and symbols should be of sufficient strength and size to remain clear after reduction. Skiagrams can be reproduced satisfactorily only if good prints or negatives are available. The reproduction of all illustrations but especially of skiagrams entails the sacrifice of time and energy and is expensive. Authors are expected to take a corresponding amount of trouble on the preparation of their illustrations, whether skiagrams, photographs, wash drawings or line drawings. The references to articles and books quoted must be accurate and should be compiled according to the following scheme. The order should correspond to the order of appearance in the article. The initials and surnames of the authors, the full title of the article or book, the full (unabbreviated) title of the journal in which the article appears, the date of the issue (day, month and year) and the number of the first page should be given in this sequence.

CONGRESS NUMBER

Australasian Medical Congress (British Medical Association)

Sydney, 1929

Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

PAGE.

PRESIDENT'S ADDRESS—
By G. H. ABBOTT, B.A., M.B., Ch.M. 454
INAUGURAL MEETING 460
PLENARY SESSION 461
THE SECTIONS—
Section of Medicine 474
Section of Surgery 487

PAGE.

THE SECTIONS—*Continued.*
Section of Obstetrics and Gynæcology 492
Section of Neurology and Psychiatry 502
Section of Pædiatrics 512
Section of Preventive Medicine and Tropical Hygiene 519
CORRIGENDUM 522

An Address.[1]

By G. H. Abbott, B.A., M.B., Ch.M. (Sydney),
President of the Australasian Medical Congress (British Medical Association).

First I have the honour and privilege of expressing thoughts which, I am confident, are present in the minds of all in this large assembly.

To your Excellency Lord Stonehaven, the representative of our gracious sovereign, His Majesty King George V, I desire to express the heartfelt joy and happiness experienced by the members of this Australasian Medical Congress of the British Medical Association on account of the recovery of our King and Emperor from his serious illness and I wish to say how proud and thankful we are when we remember that the valuable life of our noble sovereign has been saved for the Empire by the untiring efforts of members of our profession. It is our deep and earnest wish that His Majesty will be long preserved in health and in strength to rule our Empire.

To you, my Lord, we feel most grateful for the honour which you have conferred upon us in attending this meeting and in opening the Congress and also for the great pleasure afforded to us by your admirable speech. I hope, Sir, that you will forgive me for expressing my humble opinion that you are peculiarly qualified for the duty which you have so cheerfully accepted, because I know from an incident in your life which you may have forgotten, that you have the kind heart and other attributes of all great and good physicians and that, if you had not been called upon to rule extensive dominions and to perform innumerable public services, but had taken up the much more humble calling of a medical man, you would have achieved the same success in our profession as you have elsewhere and would have bestowed happiness and comfort upon many sufferers. A few years ago, Sir, you visited a surgical ward of the Royal Prince Alfred Hospital and, after I had the honour of being presented to you, you were good enough to interview some of my patients. Your kindly manner and your thoughtfulness in speaking to them won their hearts and I am confident that you will be pleased to know how delighted they were that the Governor-General had actually visited them and conversed with them; there were no more joyful subjects of His Majesty than the poor old women that you saw on that afternoon and possibly this incident, though small, will furnish one of your cherished memories.

I now wish to thank you, members of the British Medical Association, for the great honour which you conferred upon me in appointing me President of the Congress, possibly the greatest distinction which you as a body can confer upon one of your members, but while proudly conscious of the personal honour which I have received, I feel that in appointing me you were anxious to bestow a compliment on the Sydney University Medical School, in that I have the privilege of being the first graduate who passed through the regular medical course at our University, to hold this important position and I am sure that you will forgive me when I confess that I am also proud of the fact that I was the first of such graduates to be placed on the Council of the New South Wales Branch of the British Medical Association and the first to become President of that Branch. When I remind you that I was one of the two original New South Wales members of the Federal Committee of the British Medical Association in Australia, you will understand how keenly I am interested in our great association and how anxious I am that this Congress shall be a marked success. Members of the Association, I thank you most sincerely.

Everyone who has had experience of the preparations required for a congress such as this, will understand that an immense amount of work has been necessary, but the spontaneous assistance that we have received from all directions has been most encouraging.

We are very grateful to the members of the Government for the many ways in which they have aided the Congress and for the sympathetic manner in which they have treated us. Their attitude towards the profession shows that they appreciate the work that we strive to perform for the good of the State and in the cause of humanity. I especially thank the Premier who has been a friend since his boyhood, for his promise to be present here tonight and to submit one of the motions and I wish in the name of the Congress to congratulate him on his return to health.

To our university we are deeply indebted. The authorities without any hesitation placed at our disposal all parts of the buildings and grounds which were necessary for our use, and all connected with the University have been anxious to help us in every possible way.

We also wish to offer our thanks to all the ladies and gentlemen who have arranged to assist us in entertaining our guests and in many other ways.

The enthusiasm displayed by the chairmen, secretaries and members of the various committees and by the secretaries of the sections has been most exhilarating and should insure successful meetings.

The onerous duties imposed upon the joint Honorary Secretaries, Dr. Palmer and Dr. Lipscomb, have been discharged with wonderful zeal and ability and our friend, the Honorary Treasurer, Dr. Crago, has done all in his power to assist us. When worries embarrassed us and we felt the need of a kind and wise counsellor we always had the help and guidance of another dear friend, Dr. Todd. The assistance of the Editor and staff of The Medical Journal of Australia, the ever present aid of Mr. A. W. Green and the unselfish and continuous

[1] Delivered at the Inaugural Meeting of the Third Session of the Australasian Medical Congress (British Medical Association), Sydney, on September 2, 1929.

labour of Miss Chauncey and her colleagues have also justly earned our appreciation. I have not time to refer to the names of all the earnest workers among the members of the British Medical Association and their friends whose services we appreciate, but all men present will forgive me if I mention especially the work of the members of the Ladies' Committee; their enthusiasm, zeal and regular attendance at meetings and their achievements have made us all proud of them. I have had the honour and pleasure of attending their general meetings and as one knew that the doctors' wives who formed the committee, attended because of their devotion to their husbands and of their loyalty to their husbands' profession, I felt that I must pay a humble but heartfelt tribute to them tonight.

Books in plenty have been written and speeches innumerable have been made about the self-sacrifice and labours of medical men, but not nearly enough has been said of the responsibilities and sacrifices of their loyal wives and now is the opportunity in this great assembly for us who are medical men, to express our appreciation of their devotion. The ordinary lay person knows little of the responsibilities of a doctor's wife, especially in the case of an ordinary general practice. Even when help in her home is ample, she has to share many of her husband's innumerable troubles and anxieties; she supports him by her sympathy, minimizes the ill-effects of worrying days and nights, neglected meals and disturbed rest. If, in addition, the struggling practitioner cannot afford liberal domestic help, the duties of a wife are more onerous, but she makes everything a labour of love and helps and encourages him in his important work for mankind. Surely the doctor's wife is "more precious than rubies."

May I express the pride that we feel in having as our guest Sir Ewen Maclean, the immediate Past-President of that great association to which we medical men belong. His visit demonstrates the deep interest and concern which the parent association feels for its Australian offspring and I am confident that he will return to England with every assurance of the loyalty of the Australasian Branches. We also delight to welcome Professor Hugh Maclean, of St. Thomas's Hospital, London, and Dame Janet Campbell. There are other prominent visitors whose names I would like to mention, but time is limited and we shall have plenty of opportunities of showing them how well we appreciate the honour of their presence.

To you also who are members of the other Australasian Branches, we of New South Wales extend a most hearty welcome. We are very grateful for the hospitality that we have experienced at previous congresses in your capital cities and if during your stay in Sydney you are as happy as we wish to make you and enjoy yourselves as much as we desire, you will appreciate your visit to the old mother city of Australia and depart fully conscious of the mutual feelings of friendship and affection that bind us all together.

There are certain difficulties in addressing a meeting such as we have tonight, as many of you are not members of the profession. An address on purely medical subjects would not be suitable, but one of the objects of this meeting is to bring into closer contact the members of the Congress and the general public and to indicate to the latter not only some of the scientific work that is being done for the good of humanity, but also the general value of congresses such as this. Do you appreciate the full significance of our Congress and realize that in some respects there is nothing similar to it in any other part of the world? Here we have a meeting of medical representatives from the States of a large island continent, about the size of the United States of America, and from neighbouring Dominions and the assembly is practically of pure British blood, perhaps purer than that of the population of the British Isles themselves, with the same speech, characteristics and ideals; we look upon each of our visitors from what we still delight to call home as one of ourselves.

A congress such as this does much to cherish the feeling of kinship throughout these important parts of our Empire and its members are proud of the fact that they belong to one or other branch of an association which we delight to know is British. With proper care the importance and value of our congresses should steadily increase and eventually attract numerous visitors from all parts of the Empire and from many other lands.

Advances in Surgery and Medicine.

It is forty-two years since I started hospital practice at the Prince Alfred Hospital and performed my first minor operation under the tuition of Dr. (now Sir) Alexander MacCormick. Many changes have occurred during the period mentioned in the practice of medicine and surgery and the progress that has been made, is not only very satisfactory, but makes the future full of good promises. The carbolic acid spray during operations was then being used, but soon passed out of use. The value of antisepsis and asepsis was not fully appreciated. A dear old teacher, educated in the old school, told us something about bacteria and how by making a solution of boracic acid in water and putting it into a wound one could, in his words, "kill the little creatures." I have seen the same once leading surgeon take a probe out of his pocket and, without cleaning it, plunge it directly into a wound; such was the habit of his time. Fortunately his colleagues were more up to date. The principal antiseptics used in our hospital at that time were boracic and carbolic acids and later solutions of perchloride of mercury came into favour. Many persons about my age will remember that when we were schoolboys we frequently heard of many tragic deaths from peritonitis. We, of course, now know that most of those cases were due to a ruptured appendix, less frequently to a ruptured gastric or duodenal ulcer and occasionally to a ruptured gall bladder or to other causes. At the time of my

introduction to hospital life operations for appendicitis were then slowly coming into fashion, one used to hear of typhlitis and perityphlitis and then the appendix came into its own; surgical technique gradually improved and we are now able to save thousands of lives which without surgical aid would certainly be lost, notwithstanding the definition of appendicitis given in a modern, but not leading dictionary, as follows: "The same as the old-fashioned pain under the pinafore, but costing forty guineas more." Gall bladders were not removed in our hospital in those days, but were occasionally opened for the removal of calculi and drained. Now we know how successful gall bladder surgery is as a rule, if carried out under best conditions.

Professional men and laymen are conscious of the number of people who are cured and perhaps saved from death by operations on the stomach. One remembers the great interest displayed on the occasion of an operation performed by Dr. (now Sir) Alexander MacCormick for removal of a cancer of the stomach in the region of the pylorus, the first of those operations to be performed at the Prince Alfred Hospital and, I understand, the first in Australia. My old schoolmate, Dr. Purser, who acted as house surgeon on that occasion, informed me recently that ninety-nine interrupted sutures of silk were used for the stomach. The doctor was also anxious to tell me that, although there were so many interrupted sutures, the patient made an uninterrupted recovery and, if he did not hold such dignified positions in the medical and university world, I would suspect that he intended to be witty.

This operation was considered to be wonderful, but now, with the advance in surgery, much larger operations on the stomach are frequently performed with little comment by practically every honorary surgeon on the staffs of our large hospitals.

In my first year of residence in hospital I assisted the late Dr. Hankins at the first gastro-enterostomy done there. He used two Senn's plates of decalcified bone. This case caused much interest at the time. The patient recovered from the immediate effects of the operation, but died after some months' residence in the hospital and an examination after death showed that the artificial opening had closed. Now the members of the public talk glibly of short-circuiting operations and hundreds of Australian surgeons perform innumerable up-to-date gastro-enterostomies, usually but not always with a satisfactory result.

Hydatid disease was very common in my student and resident days and operations for it were frequent, but now that the public generally know more about its causation the number of cases in our metropolitan hospitals is comparately few. I suppose, of course, that many cases are treated in country hospitals and do not reach Sydney.

Diphtheria was a dread disease in those early days and when it affected the larynx was especially deadly. We saved a few patients with very severe infections by tracheotomy and tedious after-treatment. I remember how proud Dr. (now Sir) Charles Clubbe was when he announced that by improved methods of treatment in use at the Children's Hospital the staff was able to save one-third of the patients treated by tracheotomy. Those in practice about that time will remember how the advent of diphtheria antitoxin revolutionized the whole treatment of the disease, removed many of its terrors and has been the means of diminishing suffering and of saving innumerable lives. Now the Honorary Secretary of the Section of Pathology tells me that Dr. Morgan and Dr. Adey, of the Commonwealth Serum Laboratories in Melbourne, have been working to produce anatoxin, a modified diphtheria toxin which is without the dangers of toxin-antitoxin and yet is able to stimulate efficient immunity against diphtheria. It is hoped that by its use complete public confidence in immunization against diphtheria will be restored. The gentlemen mentioned are to read a paper on modern methods for the detection and abolition of susceptibility to diphtheria and scarlet fever. Then Dr. Helen Kelsey will tell us about prevention, diagnosis, treatment and control of scarlet fever and diphtheria. I am told by the Honorary Secretary above referred to, that the infecting agent of scarlet fever is now known and can easily be identified, so that great advances can be anticipated in controlling epidemics by ascertaining carriers of the disease and determining when convalescent patients are no longer infectious. Modern methods of immunizing susceptibles against scarlet fever will be dealt with in the papers to be read. So we have great hopes that the amount of danger to the community caused by scarlet fever will be reduced to a very small quantity.

Typhoid fever was a great scourge in the past in Sydney and the suburbs, but now with proper sewerage schemes and a good water supply, it does not cause us much concern.

Venereal disease still attacks a large proportion of the population as it did forty years ago. Treatment is now more scientific and elaborate and we do not see the same proportion of advanced cases that we did in the early days. In addition, the discovery of the relation of various nervous diseases to syphilis has caused a revolution in the treatment of the former. But, although modern treatment of venereal disease is usually satisfactory, there is apparently insufficient treatment in many cases and often a necessity for more prolonged supervision.

One might continue to speak for hours about the changes in treatment of many other affections, of the dangers and difficulties of the early hysterectomy, now a comparatively simple operation in skilled hands, of the great importance attached to early ovariotomy and salpingectomy, of improvements in brain surgery, bone surgery and in orthopædics, in fact about surgical subjects innumerable. The new weapons that medicine, too, has continued to add to its armamentarium since my student days could

also engage our attention for a long period. However, I have said enough to indicate in an imperfect manner some of the improvements in treatment during my career. If the advance in our art has been so solid during those years, what wonderful progress should the present generation of students see and what an opportunity will those students have of helping the community.

One has seen how, during one's lifetime, surgery has invaded more and more the realms of medicine, but in its practice it has revealed to medicine the cause and nature of many diseases and has often pointed out the possibility of cure by means other than by the surgeon's knife. Now the pendulum shows an inclination to swing the other way and one can see the probability of medicine with the aid of X ray diagnosis, serum therapy, biochemistry and the like regaining more and more of its past kingdom.

As examples, increasing numbers of ulcers of the stomach and of the duodenum will probably yield to non-surgical treatment; surgery of the gall bladder will become less important, very few thyreoid swellings may need operation, early care of children will prevent many deformities and with the future treatment of infantile paralysis will probably cause a diminution in the work of the orthopædic surgeon. He will lose still more of his practice when all our fair women suddenly decide to wear boots and shoes of reasonable shape.

The end of surgery, however, is not yet, so we still welcome any agent that will make operations more safe and comfortable and any improvements in the methods of producing anæsthesia are hailed with pleasure. The presence of a section of anæsthesia for the first time in an Australasian Medical Congress indicates the increasing interest in the subject and should be the means of further reducing the sufferings of mankind.

And now to return to medicine and surgery. With growth of population our medical schools will increase in importance and Australasian students have shown that they are not deficient in brain power, so that with proper assistance our universities should become such centres for research as to attract enthusiasts from many parts of the world.

The appointment of a full-time professor of medicine and one of surgery in our university, if we can secure the right men for the positions, should increase the amount and raise the standard of research and now by the munificent gift of Mr. Bosch the University of Sydney has been enabled to provide chairs, not only for the subjects mentioned, but also for bacteriology and I am confident that this action will increase in a wonderful manner the value of our school. I can assure Mr. Bosch that this Congress is very thankful for an action that will be useful for all Australia.

Cancer Research.

Everyone is interested in the subject of cancer and there will be a meeting of all the members of Congress in the Great Hall of the University tomorrow morning when papers will be read by representatives from the various States to inform us "what is being done in Australia towards cancer research."

In all campaigns there is a danger of exaggerating certain facts and it is not a wise thing to make the public hysterical over any subject. We all know the terrible nature of the disease and are fighting against it as hard as possible, but there are reasons which account partly for its apparent increase. We now save thousands of people who under past conditions would have died from peritonitis due to ruptured appendices, gall bladders, stomachs and the like; typhoid fever claims fewer victims, diphtheria has lost many of its terrors, we are about to get more control over scarlet fever, we can do much more to prevent and cure consumption and in many other ways we have so reduced the rate of mortality in most diseases that now if anyone wishes to die, he has not the same variety of choice as in the past. We can usually prevent him from dying from appendicitis, typhoid fever, diphtheria and many other affections, so that he is more likely to live to an advanced age and, not being allowed to end his days by one or other of the diseases that destroyed so many in the past, but are now under control, he is more likely to die of cancer.

There is no doubt in past years that many people died of internal cancer which was not recognized. The use of X rays and of improved methods of examination and also our increased knowledge enables us to diagnose, treat and frequently to cure cancers of the bowel and the like which under past conditions would not have been recognized as examples of malignant disease. The inclusion of such cases in the cancer list today helps slightly to swell the numbers.

X rays and radium are becoming more and more valuable in the treatment of malignant trouble and increased research is rapidly enlarging their sphere of usefulness. So far their application has been to a great extent accessory to ordinary surgical procedure on which we still mainly rely, but they can often carry on the struggle for life in regions that are beyond the surgeon's control.

The most practical statement that we can at present make to the public is one that we have often repeated: "If we can get cancer in its early stages, we have great hope of eradicating it." I believe that the recent campaign has done much good in educating the members of the public and in stimulating them to come for assistance before it is too late. One of the very sad experiences which surgeons have, is to examine a patient with cancer of the breast that must have been present for a long time and has reached such a stage that complete cure is impossible, whereas if one could have examined the patient earlier, a cure might have been effected. I have noticed recently a greater tendency for women who have breast tumours, to consult a surgeon early and accordingly, if the disease happens to be malignant, they have a much better prospect of permanent

cure. However, after tomorrow we should know a little more about the whole question and in time we hope to be able to control the disease sufficiently to banish or minimize its terrors and accordingly bring increased happiness and security to the human race.

The Birth Rate.

The presence of cancer, if not curable, is a terrible infliction for the individual, but there is another danger of importance to the State which may affect much more seriously our national existence.

As I proceed you may think that I am digressing from subjects of medical interest, but kindly hear the end before you judge me harshly. Here we possess Australia and New Zealand, wonderful lands, saved by providence through the centuries for the British people and bound to the motherland by ties of love and race stronger than any that unite her to other parts of her great Empire, loyal though they be. Canada, though true to Britain, is not so dependent on her; the neighbouring republic would see that no enemy could overrun her lands and is likely by penetration of its population gradually to impress on her its own ideals. South Africa, again, at heart is only partly British and some other great possessions are held mainly by force of arms and in emergency might break away. We are dependent on Britain and if Britain were to lose us, it would be a blow from which she would not properly recover. All who think, know that we have not a population sufficiently large to hold our own against possible invasions and that we should aim at making these countries Greater Britain in reality, by attracting desirable immigrants from Britain who can spare them. We know of the troubles that have occurred in reference to the immigration policy, but if we appreciate that by filling our empty spaces by men and women of British blood we are more likely to win or even prevent any war that threatens our national existence, surely the brains of the Empire, if seriously turned to the question, can surmount all difficulties. Peace conferences are right enough in their way, but if we do not properly occupy this land, we shall be unable to stop the flow of immigrants whom we consider undesirable. However, the fact that we have difficulty in getting enough of the right people to take up their abode here, makes it all the more important to have more babies of Australian birth. Make no mistake. It depends mainly on the women of Australia whether we become so strong that no power will wish to invade our land or whether we remain so weak as to tempt neighbouring land-hungry nations to try to overwhelm us. If the latter happens, our men will fight as bravely as ever, but will there be enough? And, if not enough, how do you like to think of the possibility of your beautiful daughters and granddaughters becoming the wives or worse of invaders whose ways are not our ways. If you read the list of papers to be read in the Section of Naval and Military and Air Medicine and Surgery, you will see that there are still some experts who believe that war is possible and are preparing for it. All medical men are faced with the fact that many married women avoid having a family and that many others unduly limit the number of their children and we know that often much damage is done to married women by the practices adopted. Their health may be quite ruined or may be so interfered with as to make life miserable for themselves or their husbands and to provide work for the divorce courts. Then methods used to avoid conception in the early stages of married life may take away the possibility of having children when they are desired.

If persons who advocate birth control so earnestly, would see that it is carried out in instances in which the community would gain, instead of encouraging the better educated and desirable citizens to limit their families and instructing unmarried people to carry out undesirable practices, then I might have more sympathy with them. We must remember also that what might be excellent advice in over-populated countries, might be the worst possible advice for an under-populated country like ours.

No one is more proud of or has more sympathy with our Australian women than I and I understand well the difficulties of bringing up a family under modern conditions, but one can see a tendency in many of our young people to aim at enjoying all the pleasures of this life without accepting its responsibilities.

When I see hundreds of little factory girls returning from work, I always think how much better it would be for the health of most of them if they were doing domestic work in good homes and what better wives and mothers they would make in later years, besides solving many domestic problems for those who could afford to retain their services.

Some women say that under present circumstances Australian mothers cannot stand the strain of bearing and rearing more than one or two babies. If so, it is a very sad and dreadful fact and we must accept the inevitable and eventually deliver our land to some race whose women can better bear the strain of motherhood.

However, I have not lost faith in our women and I believe that if the older members of the fair sex, instead of organizing all sorts of events to assist institutions of doubtful benefit, would form a large society to encourage a more healthy state of mind in our younger women and to educate them and help them in their troubles when they marry and have children, they would do much good. Also it should be instilled into their minds that every Australian woman who bears a child, is fighting for her country as well as any man who went to the Great War and that it is much better for a married woman to hold her own baby in her arms than a pet poodle which may give her hydatids.

I had the pleasure of attending the Australasian Medical Congress in Melbourne in 1908 and remember that even then the distinguished President, Professor Allen, was concerned at the falling

birthrate and during his excellent address he remarked:

> As far as this downward movement represents an increased recognition of responsibility on the part of parents, some extenuation may be pleaded, but so far as it implies unwillingness to accept responsibility, it can only receive unqualified condemnation . . . . The childless home lacks the deepest source of joy and those who think that they can cheat the purpose of marriage without incurring risk of personal injury, simply deceive themselves.

Now that I have preached quite a long sermon to our women whom we all admire, I would like to tell them that the medical profession is continually looking after their interests and in this Congress much time will be absorbed in discussing questions relating to childbirth and very important papers will be read. More and more interest is being taken in the subject of obstetrics throughout Australia and New Zealand and doctors are doing everything in their power to insure the safety and health of woman and child, to lessen the trials of the mother and diminish pain and discomfort as far as possible. We have now a chair of obstetrics in Sydney with a staff of teachers in clinical obstetrics, and in Melbourne a chair of obstetrics has recently been inaugurated, so that our universities are doing their part and the main teaching hospitals in our capital cities are steadily growing in size and importance.

I am very grateful to Professor Windeyer who has kindly given me valuable information to use in this address.

In New South Wales a director of maternal and infantile welfare with a trained staff to assist him has been appointed and the passing of the *Nurses' Registration Act,* together with the "Regulations governing the Practice of Midwifery Nurses" which have been drawn up by the Nurses's Registration Board, is proving to be of great value.

The appointment of Professor H. Jellett as Director of Maternal Welfare in New Zealand and the investigation in regard to the maternal mortality and morbidity in the State of Victoria show that in other parts of Australasia the importance of the subject is well recognized.

We are looking forward to gaining much advantage from the appointment of Dame Janet Campbell by the Federal Government to advise in regard to the reduction of maternal mortality and also to the post-graduate courses of instruction organized by the Branches of the British Medical Association in several States.

The importance of the examination and medical supervision of expectant mothers is being more fully recognized so that many disappointments and tragedies are being averted. As much as possible is being done by the judicious use of anæsthetics and by other means to minimize as far as possible the sufferings of the child-bearing woman, so that prospective mothers will look forward to their coming trials with less apprehension.

I have said enough to show the women of Australia and New Zealand that we all are doing our best to help them and now, if they do their part, what a fine race of strong men and beautiful women will eventually occupy these lands. We have a glorious heritage, a wonderful start in life, most favourable prospects and if we use our advantages properly, what a wonderful Greater Britain we shall build up in these southern seas!

May I lead your thoughts back thousands of years and remind you how the ancients worshipped the powerful and beautiful Apollo, the God of Light. By his health-giving rays he drove away disease from the marshy lands; he made those who worshipped him healthy, strong and beautiful; for many centuries in numerous cities he was esteemed as the healing god, a fitting father for the great and good Asklepios or Æsculapius.

Here in Australia Apollo still reigns and scatters his health-giving rays most abundantly, but we do not always worship him as we should and thereby many lose gifts of health well-being. But to come back to the present, our modern and up-to-date Honorary Secretary of the Section of Preventive Medicine tells me how artificial sunlight as an adjunct to the treatment of malnutrition, rickets and tuberculous joints in children is becoming more and more extensively used and as some of you know in countries where natural sunlight is somewhat deficient, apparatus have been installed in many institutions for the treatment of children with artificial light.

Irradiation of foodstuffs by artificial light has been found to improve the nutritive value of certain foods to a considerable degree; it has been suggested that it may be possible in the future to improve the nutritive value of cheap vegetable oils which possess no vitamin activity, so as to provide plentiful, cheap foodstuffs equivalent to scarce and valuable animal fats.

Here in our fair land where we are blessed with abundant sunlight and fresh, pure air, two of the few things which we can get for nothing and are not yet taxed by our paternal governments, many waste their best hours in bed and do not experience the beauties of the dawn, except occasionally when returning home.

Under ordinary conditions dancing is a healthy exercise and no sensible person wishes to interfere with reasonable pleasures, but dancing until three o'clock in the morning in a crowded, dusty and ill-ventilated room filled with bacteria not only impairs health, but limits the time that might be given to outdoor exercise. It also provides work for many beauty specialists whose results are not to be compared to the charm and freshness that can be gathered from the light and air of early dawn. Many of us were very sorry when one of the most sensible acts of the Government, the *Daylight Saving Act,* was repealed. Is it possible to get it back again?

To you who do not belong to our profession, I have attempted to point out the good progress made in the treatment of disease in forty years, to give

you an impression of the value of our congresses and to remind you that you have an army of fellow men and women continually working for your benefit.

I hope that I have made you realize that if the advances in treatment have been so great during the past, what wonderful prospects are before us. I have to thank you for the compliment you have paid to the profession tonight by being present and for the sympathy which you always feel for us, even if you sometimes grumble at our imperfections. You know, deep down in your hearts, that we are your friends and that you are usually glad to see us in times of trouble.

To the members of my profession who are ever striving for the good of our fellow men, who in the practice of their craft have sleepless nights, long, tiresome journeys, worrying operations and other serious work, I can only say: "Be not weary in well-doing" and remember what a celebrated physician, Sir Thomas Browne, said about 250 years ago: "Let not disappointment cause despondency nor difficulty despair!" In addition, if some of you feel at times that you have not been compensated sufficiently in hard cash for your labours, worries and anxieties, it will afford you great comfort as you grow older and think over what you have done for others to hear a whisper: "Well done, good and faithful servant!"

Inaugural Meeting.

The third session of the Australasian Medical Congress (British Medical Association), Sydney, 1929, was formally opened in the Town Hall, Sydney, in the evening of Monday, September 2, 1929, by His Excellency the Governor-General, the Right Honourable Lord Stonehaven. There were approximately 2,500 persons present.

His Excellency the Governor-General stated that in speaking on an occasion such as that for which they were gathered together, he experienced difficulty either in the choice of the subject or in compressing into a reasonably short time all the matter that he had to say. It was easy to choose a subject for the formal opening of the Medical Congress. His Excellency paid a tribute to the work of the medical profession and maintained that its members had been in the forefront of the progress of civilization. He referred to the gratitude that everyone must feel to the doctor whose assistance they had from time to time summoned. He spoke of the recent illness of His Majesty the King and of the splendid work of the physicians, surgeons and nurses who had been in attendance; through their skill, knowledge and care that precious life had been saved to the Empire. In the next place His Excellency spoke of the family doctor. He maintained that the family doctor was the family friend. A century and a quarter previously there had been four doctors in the Commonwealth; that number had increased to 5,457 and he wondered whether they were all making a living. It was a great achievement of the medical profession that Australia had almost the highest birth rate and the lowest death rate among the civilized countries. The profession contained members whose eminence was recognized all over the world. He was aware that on one occasion a person had travelled from London to Sydney to consult a medical practitioner whose reputation in connexion with the particular disease from which he was suffering, justified the long journey. He called attention to the fact that the flying doctor extended his practice over an area with a radius of three hundred miles and emphasized the fact that it was a great sacrifice for a cultured man whose education was more prolonged than that of any other, voluntarily to bury himself away from all centres of culture. The flying doctor had brought a sense of security to the people living in these distant places far in excess of any other provision that could be made for them. He also referred to the extra professional activities of doctors throughout the country and to the immense value of this work.

In the next place His Excellency referred to the priceless work of the medical profession in Egypt during the war. Thousands of lives were saved by the improvements in sanitation and the organization of the conditions of living. Both in Egypt and in India modern medicine had achieved what in ancient times would have been regarded as the impossible. Moreover, in the work of spreading civilization among native races the doctor had done more than his share.

In turning to the practical side of the work that lay before the members, His Excellency stated that no association of professional men had a finer record than the British Medical Association throughout the whole Empire. That this Congress was regarded as a very important event was proved by the presence of Sir Ewen Maclean, the retiring President of the British Medical Association. Dame Janet Campbell's presence, too, demonstrated the recognition of the importance of the gathering. They had also with them a band of eminent representatives of the medical profession from the neighbouring Dominion of New Zealand. All this was an indication of the reality of the links of Empire. He was convinced that the Empire rested on a thousand intangible links such as those on which the British Medical Association was founded. The Branches of the Association in all parts of the Empire were collaborating in the work of understanding disease and were forming powerful teams for the better achievement of their objective.

His Excellency dealt briefly with the modern work of school hygiene and the care of the school child and compared the practice of the day with that described by Charles Dickens in "Nicholas Nickleby"; instead of giving brimstone and treacle because it took away appetite and was therefore cheaper, everything was done to render the child healthy, happy and active. In conclusion His Excellency maintained that while the whole outlook of humanity had been changed by the successful endeavours and determined work of the medical profession, the public should not accept all this without giving some return. He made an appeal from those with means to assist the encouragement and endowment of research.

Dr. G. H. Abbott, the President, read his address (see page 454).

The Honourable T. R. Bavin, K.C., Premier of New South Wales, moved a vote of thanks to the President for his address. He stated that he had great pleasure in discharging this duty, not only because the address was so pleasant to listen to and profitable, but also because the occasion was a remarkable one and there were so many people listening to that address. He spoke of his own personal friendship with Dr. Abbott, which had been in existence for more years than he cared to count. Dr. Abbott was a distinguished University graduate, an efficient hospital administrator, a skilful surgeon and a wise counsellor who had helped to uphold the highest traditions of the profession. Dr. Abbott had spoken of his first minor operation performed forty-two years previously, but with characteristic modesty he had not mentioned the result. He was reminded of an eminent jurist who had been asked whether he had contributed to the administration of justice in the course of his practice. He had replied that he thought so, for in the early days of his professional work those who should have been acquitted, had been convicted, while later, those who should have been convicted, had been acquitted. He was satisfied that Dr. Abbott had nothing to reproach himself with. If he struck an average, it would be found that he had contributed to the advancement of his science. Dr. Abbott had not confined the whole of his time and energies to

his professional calling. He belonged to a small but dignified group designated by the name numismatists, Dr. Abbott's sideline consisting in the collection of coins, but it should not be thought that this indicated that Dr. Abbott placed the gaining of material wealth above his other ideals. Mr. Bavin stated that the selection of Dr. Abbott as President of Congress was in itself a tribute to his distinguished public service. He tendered in the name of the public of New South Wales a hearty welcome to the medical profession.

Sir Louis Barnett said that he realized the honour and responsibility attaching to the president of a congress of this character. He himself had been in the same position two and a half years previously in Dunedin. Speaking from experience he was sure that Dr. Abbott was a much happier man than when he had entered the hall that evening. It was a great relief to get the address off his chest. He was satisfied that it was a great help to the medical profession for a large number of picked men to gather together and to discuss matters of the moment. Apart from the scientific advantages the congresses provided a means for establishing binding friendships. Sir Louis made a touching reference to the great loss suffered by the profession by the death of George Adlington Syme. At Dunedin that great man had inducted him to the chair. He would that he possessed the power of inspiration and stimulation that George Adlington Syme commanded, so that he might wish Dr. Abbott well and encourage him as the leader of a very powerful organization. The Australasian medical congresses had been the means of bringing the members of the medical profession from the several States in Australia and from New Zealand into close cooperation. He was satisfied that these congresses would contribute to the solution of political and social difficulties as well as of scientific problems. He had much pleasure in supporting the motion of the Premier of New South Wales.

The motion was carried with acclamation.

Dr. Abbott replied briefly in suitable terms.

Presentation of the Gold Medal to Dr. W. H. Crago.

Dr. G. H. Abbott said that his next duty was a particularly gratifying and pleasing one. He had the honour to present to Dr. W. H. Crago the gold medal of the British Medical Association in Australia for distinguished service. Dr. Crago was born in the old country, but had become a representative of White Australia and Dr. Abbott claimed that there was not a whiter man in all the Branches of the British Medical Association in Australia. He remembered many years before having heard from a patient at the Royal Prince Alfred Hospital a great deal about the wonderfully kind family doctor who had attended him. That had been Dr. Crago's reputation from the earliest days of his practice. He had been a member of the British Medical Association since 1884, a period of forty-five years. He had been a member of the Council of the New South Wales Branch from 1889, Honorary Treasurer from 1889 to 1893, President of the Branch in 1894 and again Honorary Treasurer of the Branch from 1895 onwards. Dr. Crago had been the manager of the *Australasian Medical Gazette* from 1895 when it had been acquired by the New South Wales Branch, till 1914, when the *Australasian Medical Gazette* and *The Australian Medical Journal* had ceased to appear in order that the federal journal might take their places. Dr. Crago had been Chairman of Directors of the Australasian Medical Publishing Company, Limited, from 1913 to 1924. In the next place he referred to Dr. Crago's hobby for building homes for the British Medical Association. He had been instrumental in placing some of the bricks in the house of the New South Wales Branch in Elizabeth Street and since its erection he had acted as house attorney. He had also taken a very active part in the planning and the making of financial arrangements in connexion with the new building in Macquarie Street. His example had been followed by other Branches.

Among Dr. Crago's many other activities were those of Honorary Auditor to the Federal Committee which office he had filled since 1912, of Trustee to the New South Wales Medical Union, of Trustee of the Medical Officers' Relief Fund and at the time of speaking, of Honorary Treasurer to the third session of Congress. He wished to mention that Dr. Crago was the only surgeon who had removed a hydatid cyst from the brain of a patient who had recovered and remained well for a period of thirty years. In handing the medal to Dr. Crago, Dr. Abbott remarked that the history of the New South Wales Branch appeared to be practically the history of Dr. Crago's association with it.

In his short speech Dr. Crago expressed his appreciation of the kindness of Dr. Abbott and his colleagues. He valued the medal very greatly.

Vote of Thanks to His Excellency.

Sir Ewen Maclean, the retiring President of the British Medical Association, moved a vote of thanks to His Excellency the Governor-General for his admirable address and for having graciously consented to open the session of Congress.

His Excellency replied briefly.

Plenary Session.

Cancer Research.

A meeting of the whole Congress was held in the Great Hall, University of Sydney, on Tuesday, September 3, 1929, Dr. G. H. Abbott, the President, in the chair.

Dr. F. P. Sandes (Sydney) said that cancer was the great medical problem of the white race in the coming generation. Throughout the civilized world its inroads were viewed with increasing alarm. The public mind was naturally focused upon the medical profession as the first line of defence against an enemy remorseless, inscrutable and ever advancing. In the antipodes the British Medical Association comprised the most experienced, the most influential and the best informed section of the medical profession. It was therefore fitting that in the Great Hall of the University of Sydney which had played a prominent part in the Australasian cancer campaign, the Australasian members of the Congress should devote their most serious attention to a consideration of the existing position and future developments in regard to cancer research, cancer education and cancer treatment.

The members of Congress had to thank the President and his officers for affording them an opportunity of discussing the subject of what was being done in Australia towards cancer research. In view of the fact that other members would deal with matters of detail, he would attempt to define in a general way the principles upon which Australasian work should be founded, to mention their failings and to suggest how their defects might be remedied. Cancer research could be described as investigation in any branch of pure or applied science that had reference to the origin, clinical features and treatment of malignant disease. If this definition were accepted, the effective direction and prosecution of the research would require cooperative effort on the part of specialists in the various departments of science. In the attainment of this object it would appear reasonable to assume that universities and hospitals with their opportunities for the collective advancement of knowledge in scientific laboratories were most suitable organizations for that purpose. It might be necessary to add to their equipment and personnel in certain particulars, so that advances in pure science might be applied to the work of medical discovery in directions in which progress might be expected. Guided by this principle the Senate of the University of Sydney seven and a half years previously had set its hand to the establishment of a cancer research organization within the University to which at a later stage had been added a subdivision having particular reference to the application of research to treatment in hospitals. During that time they had taken particular interest in the work that was going on in other parts of the world and it was perhaps opportune in the presence of distinguished repre-

sentatives of British medicine and British surgery to mention that the University organization was affiliated with the British Empire cancer campaign. They hoped that the Australasian organization might soon be welded into a unit more composite than it was at the present time. But that was a matter upon which the influence of the Congress would be brought to bear. During the seven and a half years it had been at work the University had collected from all sources a sum of over £130,000. Generous University benefactors, the Federal and State governments and a liberal public had provided the money. Existing University laboratories had had additions made to their equipments and a new biophysical laboratory had been established and furnished at a cost of £7,000. Research workers had been appointed and directors with committees of specialists had supervised the activities of the research and treatment departments. In the hospitals the University had arranged clinics where cancerous patients could be examined and advised by committees of specialists. X ray machinery had been installed and the radium, provided by the foresight of the Federal Government, had been brought into use in accordance with the official requirements. Further, the University had completed a radium emanation station which would enable it to distribute the benefits of radium widely to members of the public through the medium of medical practitioners trained in the use of emanation, who practised in outlying districts, as well as in the metropolitan hospitals.

Dr. Sandes said that he would be voicing the sentiments of the members of the Congress if he tendered their thanks to the Commonwealth Government for its foresight in providing an adequate supply of radium to be used in investigations as to its value in the treatment of malignant disease. They should also offer their thanks to the State governments and to other authorities and organizations who had made available in every State modern facilities for the treatment of cancer. The Congress should express the opinion that the treatment of cancer by such agencies as X rays and radium should be vigorously encouraged.

As illustrations of the work which had been done since the research organization had started, Dr. H. G. Chapman, the Director of Cancer Research, would give more details in regard to the work in the research laboratories. As Director of Cancer Treatment Dr. Sandes wished to mention something of the work that was done in the various clinics in the hospitals, so that they might get some idea of its volume. At one clinic alone during the last fifteen months over one thousand patients had presented themselves for examination, treatment and inspection after treatment, involving about six thousand attendances. Some five hundred patients had been treated by deep X ray therapy and about eight hundred by radium with or without surgery. The appalling destructiveness of cancer as illustrated by the large number of patients in a hopelessly advanced stage who presented themselves at these clinics, was a pathetic commentary of the limitations of their knowledge and their capacity to deal with the disease.

Cancer Research.

He wished to make a few remarks concerning the principle of cooperation in science as applied to cancer research and the influence of scientific investigation in different departments of knowledge upon the questions which they were considering. The fundamental problem of natural philosophy was the origin of energy in the universe and the manner in which it was conserved and distributed in its many forms. The mathematician, the astronomer, the physicist had from time to time developed theories as to the origin of matter from the eternity when "all was without form and void." They had examined many theories as to how energy became associated with and condensed into mass which they defined as the quantity of matter in any given substance. With subtle inquisitiveness and marvellous ingenuity and refinement they had explored the mighty abysses of space, the evolution and constitution of the nebulæ and stars and they had dissected and classified those infinitely small machines called atoms whose combinations and repulsions were the province of the chemist. They had measured the unit or quantum of action in this process of condensation of energy, the force of gravity, the unit of electrical charge, the speed of light and had supplied them with a multitude of statistical data to enable them to theorize regarding Nature's design in the world, not only of inanimate but also of living things. They had also shown how energy was released upon matter in its various forms under suitable stimuli as electro-magnetic disturbance or radiation. In spite of their untiring industry and high accomplishment their theories of static and dynamic atoms as energy distributors gave little satisfaction to the chemist in affording a mechanical explanation of the simplest chemical processes and less still to the biologist in his curiosity as to how protoplasm with its complicated physical structure and chemical functions was able to maintain the phenomenon they designated life, unless they took refuge in postulating some vital quality of which they knew nothing. Life with its marvellous display of purposeful and consummately directed energy as seen in the evolution of animal things, in the development of a complicated individual from a single cell in his growth to maturity and his decline had ever been the greatest material mystery that had puzzled the mind of man.

In the investigation of the processes of normal and abnormal growth the cancer research worker, whether he were biologist, physiologist, pathologist or surgeon, started at an enormous disadvantage, because other branches of science upon which he had been taught to rely, had not provided him with the accurate knowledge of the simplest natural processes which was desirable if he was to work logically and without waste of effort. They had high hopes that, as knowledge advanced, by the combination of physical and biological investigation, by physico-chemical research and by biochemical experiment the three sciences upon which their system of medicine rested, would become more intimately connected and more useful to each other. The more imaginative workers in biological research were beginning to realize that in science "no one liveth to himself and no one dieth to himself" and that the physicist's discoveries or the chemist's application of them might profoundly modify preconceived ideas of biological processes, physiological function and pathological conditions.

Every system of organized cancer research must provide for free and frequent consultation with each other of the workers engaged in different avenues of investigation, so that each might have, as far as his training permitted, a sympathetic understanding of the problem of his fellow worker. The time had long gone by when it might have been expected that in their morning newspaper they might read the announcement to a wondering world that the cancer problem had been solved by the discovery of some well-known or obscure person. The war against cancer, like any other war, must be carried on by combined effort with a well thought out plan of campaign, by attack from many points at once, by consolidating every advance, by retreat from an untenable position and by revising the plan of campaign, if necessary, in the light of the knowledge acquired.

Such a campaign needed generalship and staff work, with plenty of resources in men and money. Money was relatively easy to obtain, but in their present day commercialism, the securing of research workers with originality of mind and persistence of effort was difficult. The medical student or young graduate possessed of such qualities, inspired perhaps by his teacher or by some investigator, would willingly devote his life to the research for truth. Herbert Spencer said that "science is organized truth," but the student or young graduate who would be her disciple, was impelled by his common sense to recognize that if he followed his inclinations, he might look forward to a life of poverty or asceticism with less money for the good things of life than the average tradesman. He knew that in Australia at the best he might attain the prize of a university chair or some similar position where his energies would be spent in teaching, examining and administration. The remnants of his time, if he drove himself to the utmost, might be devoted to research. The remedy was to encourage research work as a vocation, giving originality and imagination full play under suitable control and providing an assured career and a liberal income, so that research as a life's calling would be regarded with the same dignity as a profession. Financial authorities looked askance at the proposal to pay £500 or

£750 to whole-time research workers, forgetting that their qualities of brain would, if devoted to a business or profession, be assured of substantial monetary reward. It was largely by the industry of such people that knowledge advanced and the lot of the human race improved; as long as they were neglected, so long would disease stalk the land and cancer exterminate those who would not read the writing on the wall.

Cancer Education.

Though in days to come research might bear beneficent fruit in arresting the cancer scourge, there were other aspects to which Congress should give consideration in the hope that they might be able to reduce mortality more immediately. He referred to the educational aspect of cancer work. They all recognized the frequency of cancer; they as a profession must always keep their minds open for its occurrence in forms which were aberrant, in which the history or progress was different from the usual one, so that by early recognition and by efficacious treatment the mortality might be reduced. They should remember that in some types of superficial cancer irritation by unsuitable treatment might do harm to the patient. Although they might recognize these things frankly and honestly and try to eradicate their own faults, there was a greater lion in the path. He referred to the helplessness and ignorance of the great majority of people and their carelessness in regard to their own health. For this there was no other remedy than education. The University had not directly undertaken any cancer educational campaign, although indirectly the public had been awakened to a sense of danger. What was the duty of the members of the British Medical Association in the circumstances? Though they might fear that publicity would breed a certain number of cancerphobes, surely they should be able to lend their assistance in a matter of such urgency to a scheme for informing the public as to the increasing danger of malignant disease and as to its early recognition. This had been done in the case of venereal disease, tuberculosis and many other diseases, such as small pox. Such instruction, whether by writing or lecturing, need not necessarily be made harrowing. It might be made just as interesting and be of as great value as sport, politics, finance or the private misfortunes of their fellow men. Surely in the interests of the saving of life and the amelioration of suffering it was not beyond their wit to provide a system of authoritative instruction. France and America carried on educational work in regard to malignant disease. In England the Ministry for Health had given a stimulus to popular instruction by the periodical issue of informative pamphlets on cancer. Even the distinguished President of the Royal College of Surgeons had deemed it not beyond the duty of his exalted office that he should publicly draw attention to the seriousness of the position. With a tactful encouragement to an early consultation with the family physician came early diagnosis and the hope of cure, the saving of life and the relief of suffering.

Cancer Treatment.

Apart from the question of research and education in cancer, some attention should be given to treatment. In the present state of their knowledge surgery must still be their sheet anchor. But malignant disease often occurred in places inaccessible to the scalpel and it often recurred unexpectedly in spite of the excellence of the surgeon's craft. They should acknowledge that their results were not very encouraging and that if by chemical and physical means they could secure any improvement, it was their duty to put such methods to the test. The University had established a laboratory for the preparation of colloidal lead and had arranged for its distribution to hospitals and practitioners. In spite of the lack of success that had attended the colloidal lead treatment, the research department was still carrying out experimental work in regard to lead in tissues and looked forward to a comprehensive survey of the whole subject of the injection of colloidal metals and biological substances when a suitable laboratory was available. The effect of radiation upon tissues was being investigated in the biophysical laboratory. No unbiased observer would deny the great utility of X rays and radium in certain types of cancer. and anyone who was wilfully blind to the possibilities of such agencies should realize that he was possibly falling behind in the race. As their interest in this work increased they could not but be convinced that the day of electro-magnetic surgery had come. The surgeon who was wilfully blind to the possibility of such agencies, was falling behind in the race. By empirical methods the X ray and radium therapists had acquired a certain standard of knowledge. They had begun to realize that if progress was to be made, they should go into the research laboratories to ascertain the effect of these potent agencies upon cells which, whether normal or malignant, were the units of organization of the cancerous person. They called to their aid the cytologist who had assumed a leading position in histological investigation, and the physicist learned in the theory of radiation which was occupying the attention of the most famous investigators in the civilized world. He hoped that by cooperation with these advances would be possible in the science of radiotherapy or electro-magnetic surgery. A short account of the history of their progress might be of interest.

Fifty years previously Clerk Maxwell, Cavendish professor at Cambridge, deduced from mathematical reasoning that light would be found to be an electro-magnetic wave phenomenon. In the 'nineties of the last century Hertz had applied Maxwell's theory to wireless telegraphy. Röntgen had discovered the X rays and Madame Curie had isolated radium. Since that period research into the properties of wireless waves, heat, visible light, ultraviolet light and the other shorter waves, such as Schumann and Lyman waves, X rays, the γ waves of radium and the most recently discovered and shortest cosmic rays or waves had proceeded apace. Medical science had not been slow in applying some of these agencies empirically to the treatment of disease, but it had taken the physicist some years to arrive at the conclusion that the only differences between them were in wave lengths and the energies they manifested which, theoretically at any rate, increased with the shortening of the wave length.

There was considerable justification for the statement that just as they lived in an atmosphere exerting a pressure of fifteen pounds to the square inch and yet were unconscious of it, so, too, they lived in a matrix or medium charged with electro-magnetic vibrational energy carried by waves of all lengths. It would almost seem that such an environment was a necessary precedent to the evolution of a material universe and the phenomena of life and that the statement in Holy Writ that God said: "Let there be light and there was light" was the expression of a profound scientific truth. If it were assumed that matter was formed and the atoms of the chemical series gained their particular qualities as the result of a periodically progressive and possibly pulsatile condensation of an extremely tenuous ancestor in Nature having perfect elasticity and the qualities of an ideal gas and if it were also assumed that in this process the atoms acquired mass, electric charge and atomic heat and that such condensation reached its limit in the radio-active elements when the rebound explosion and pulsations became manifest to the physicist with the giving off of energy in the form of α and β particles and electro-magnetic waves, it might be argued that in the atoms from hydrogen upwards to radon (that was radium emanation) there resided a similar inherent quality not yet demonstrated experimentally by the physicist except partially in the case of potassium and rubidium. And if again it were assumed that chemical combinations and inertness, that was to say chemical valency and non-valency, were dependent upon the attraction and repulsions of electrical charges in atoms and the varying periodicity of their emitted electro-magnetic waves, the biological investigator was provided with a theory upon which he might set to work. He might possibly be justified in inferring that the colloid systems of living protoplasm were devices to slow down or curb the energy of the constituent atoms, so that "vital" phenomena might be rendered possible and he might even go so far as to say that the bombardment of such colloid aggregations in living cells, whether normal or malignant, with X rays

and γ waves would by resonance or interference effects alter the working of their mechanism and interfere with their nutrition.

He advanced this theory with some hesitation as a possible explanation of the effect of radiating living tissues, realizing that a meeting such as a medical congress was not perhaps the best place to put it forward. It might serve, however, as an illustration of how abstract speculation in physical science might offer to the investigator of problems of cancer a clue as to the reason for the failure or success of radio-therapeutic measures. He hoped that in the future exquisite dissection of the most minute and even subatomic component of cells by electromagnetic waves produced by specially designed machinery or by radio-active substances, might add to the artistry of surgeons and lead to improvement in their existing methods of treatment.

Professor Peter MacCallum (University of Melbourne) in opening the discussion on what was being done in cancer research in Australia said that though no organized effort on the scale of that in course of development in New South Wales had been made in Victoria, there was nevertheless a not inconsiderable volume of individual effort being directed towards problems of tumour growth in various laboratories and institutions in that State.

In the University of Melbourne Dr. Cherry, under the auspices of the University Cancer Committee, was continuing the statistical and experimental researches on the relationship between tuberculosis and cancer in mice, which was begun by him some three years previously at the Walter and Eliza Hall Institute, and which had already given remarkable results. He was a full time research worker and was assisted on the bacteriological side by Dr. Wanliss. The funds for this research had been provided from various sources, the R. J. Fletcher bequest, the Grice fund and the State Government.

In the Pathological Department Dr. E. S. J. King was investigating certain growths incident in women, Dr. Apperly gastric changes in patients suffering from cancer and Dr. Willis, Superintendent of the Austin Hospital for Chronic Diseases, the method of spread of certain forms of skin cancer. The funds for this had been found by the University of Melbourne and the Edward Wilson Trustees.

In the Physiology Department Dr. J. L. Jona had been developing a method for the exhibition of lead in the treatment of cancer.

At the Walter and Eliza Hall Institute and Melbourne Hospital Dr. Kellaway and Mr. H. F. Holden, biochemist, were investigating tissue extracts from cancerous subjects. Dr. Wright Smith had been engaged in recording observations on and reviewing the subject of certain bladder tumours. Dr. Searby had just concluded a survey of the results of operative treatment in cancer at the Melbourne Hospital.

At the Baker Institute and Alfred Hospital Dr. Penfold and Mr. Sutherland had been studying the effect of colloidal lead in the treatment of selected cancer patients and had also pursued researches in the physical properties of colloidal lead and the influence of light thereon. They had also done some experimental work on immunization against tumour growth in animals. Dr. A. J. Trinca had made a study of the relationship of certain so-called inflammations of the breast and cancer development. Dr. Fiddes and Dr. Maclean had just recorded their experience of the nature of certain growths of the abdominal cavity.

At the Commonwealth Serum Laboratories Dr. Hurst and Miss Doery under his direction in a very specially equipped laboratory, were carrying out researches on the nature of the metabolism of cancer growths and had confirmed the work of Wasburg on that subject. They had also arranged to examine the experimental material that Dr. Cherry had obtained in his mice. They had also maintained certain transmissible tumours of mice at the Commonwealth Serum Laboratories.

The Government of Victoria was considering the question of organizing cancer research and treatment and the report of a special advisory committee acting under the chairmanship of Dr. Charles Kellaway had already been laid before them. The cooperation of the Commonwealth Government was hoped for. So far the funds had been obtained from the resources of the various institutes, from bequests and gifts and from somewhat sporadic assistance from the State and Commonwealth Governments. Organized assistance would undoubtedly greatly enhance the opportunity to pursue this most important inquiry with greater intensity.

Dr. E. S. Meyers (Brisbane) read a contribution by Dr. E. Sandford Jackson. He said that in August, 1927, the cancer campaign in Queensland had been originated by Sir Neville Howse, the Federal Minister of Health, and Colonel Cameron, member of the Federal House of Representatives for Brisbane. After an interview with the Mayor and upon the suggestion of Colonel Cameron, the Queensland Branch of the Public Health Association of Australasia arranged with the Queensland Branch of the British Medical Association for representatives to confer with the Mayor, Alderman W. A. Jolly. As the result of this conference it had been determined to organize a public meeting. Invitations were sent to Sir David Hardie, President of the Public Health Association, Dr. H. V. Foxton, Dr. E. Sandford Jackson, Dr. E. S. Meyers, Dr. J. B. McLean, Medical Superintendent of the Brisbane and South Coast Hospitals Board, and others. Captain Pike, secretary of the Health Association, acted as secretary.

A public meeting had been called by the Mayor and held on August 26, 1927. At this meeting those present were addressed by His Excellency, Sir John Goodwin, Sir Neville Howse and the Honourable James Stopford, Home Secretary for Queensland, and by Colonel D. C. Cameron. A representative committee had been appointed with power to add to its number; a resolution had been passed asking the Federal Government to take steps to coordinate cancer research and treatment throughout the various Australian States.

Sir Neville Howse on behalf of the Federal Government had promised a subsidy of £5,000 and a similar sum had been promised by Mr. Stopford on behalf of the Queensland Government.

A number of committees had been appointed following the lines of those adopted in New South Wales and Great Britain as follows: (i) A general committee, to be responsible to the subscribers for the carrying out of the campaign, (ii) a committee of direction responsible as a scientific board for planning and carrying out the details of various treatments and of the records which must necessarily be kept, (iii) a finance committee cooperating with the committee of direction and attending to details of expenditure, (iv) a clinical and pathological subcommittee cooperating with the committee of direction, (v) a radio-therapy committee cooperating with the committee of direction, (vi) a publicity subcommittee to carry on propaganda and raise funds in cooperation with the finance committee under the direction of the committee of direction, (vii) an educational subcommittee to disseminate information, especially stressing the need for early treatment, (viii) an organizing committee appointed to control the arrangements for the appeal for funds.

At this meeting it had been reported that the Federal Government had ordered radium to the value of £100,000 which it was considered would be sufficient for the wants of the Australian States. The finance committee had taken charge of the financial affairs of the campaign and it had been arranged to launch an appeal to the public throughout the State. The objective of the appeal had been set at the sum of £100,000. Mr. Hayes, a paid organizer, had been appointed in the month of December of 1927 and Mrs. R. J. Hamilton Lewis had been appointed to assist him.

It had been determined that the appeal should be launched in every district throughout Queensland on the same date. Local committees and public men had been invited to interest themselves in the campaign and to institute committees of citizens in their various districts. The chairman of the committee of direction, accompanied by the organizer and a member of the radio-therapy committee had visited the principal northern towns between Brisbane and Cairns, had addressed public meetings and

had arranged for committees in each town to organize public meetings. Much cordial help had been received from the press throughout Queensland; publicity had been arranged and carried out. Special supplements had been issued by nearly all the papers and posters and literature had been distributed in each shire. In the metropolis the National Council of Women, under its president, Mrs. Cumbrae Stewart, had taken charge of the appeal meetings held in Brisbane. The Country Women's Association, too, and its president, Mrs. Fairfax, had given valuable assistance throughout the State. Large meetings had been held in the metropolis, Toowoomba, Warwick, and elsewhere under the auspices of the Country Women's Association by various medical members of the campaign committees. The Orient Company had generously offered the use of one of their ships, the *Orama*, for the holding of a dance and £400 had been received from this source.

The final effort of the appeal had been an "Ugly Man's Competition" which had resulted in the collection of £3,609. The total amount collected by the appeal had been £51,628 13s. 8d. and the expenses incurred in making it had been £2,391 11s. 11d.

The wants of the Commonwealth having been apparently supplied by the purchase of radium to an amount of £100,000 by the Federal Government, the committee of direction had suggested that it would be advisable to instal X ray plants, both at the Brisbane General Hospital and at the Mater Misericordiæ Hospital in Brisbane to begin with and later others in certain northern and country centres, as occasion presented itself. Medical men who had spoken at the public meetings, had foreshadowed this design and had endeavoured to make it clear to those who attended the meetings, that in general every form of treatment that seemed to promise success, would be considered.

Early in the history of the campaign, therefore, a supply of lead colloid forwarded by the Agent-General for the State of Queensland in London, had been sent to the committee and made use of. After the treatment of a number of patients under the control of the clinical and pathological subcommittee, the results had been found to be not encouraging and the treatment had been discontinued.

Some delay had occurred in making radium supplies available in Queensland and therefore the purchase of half a gramme for the special use of Queensland patients had been made through the agency of the British Empire Cancer Campaign Committee at a cost of £6,977. Since then another half-gramme had been ordered, a quarter-gramme for the Mater Misericordiæ Hospital and a quarter for the Brisbane Hospital.

The Cancer Campaign Committee not being a statutory body, the Federal Government had been compelled to deal in the matter of radium with the Brisbane and South Coast Hospitals Board, which fulfilled the qualification. The disability of the Cancer Campaign Committee in this respect had been removed on January 31, 1929. A cancer trust had been formed practically to replace the old finance committee of the cancer campaign, and letters patent had been granted to it. The cancer trust under the chairmanship of Mr. F. R. Lloyd consisted of two representatives of the Queensland University, three from the Queensland Branch of the British Medical Association, one from the Australian Workers' Union, one from the Red Cross Society, one from the National Council of Women and one from the Country Women's Association.

The appeal for funds had been closed about the time the cancer trust was formed, though various members of the committees pointed out that, while the sum of £51,000 collected from the public of Queensland was, in view of the depressed financial conditions of the State, very creditable, further sums would undoubtedly be necessary at some later date. Such speakers foreshadowed the necessity for continuing the appeal.

Since the cancer campaign had been begun in Queensland considerable effort had been made to keep before the public the need for early treatment. Posters, appeals and speeches in this direction had been freely used throughout the State from the beginning. Still more should be done in the future.

Reports of the proceedings of the cancer campaign since its inception had been forwarded from time to time to the Federal Health Department and the chairman of the committee of direction had attended two meetings of the Federal Advisory Council which had been appointed to assist in the coordination of work. The meetings of this council had been held in February, 1928, in Melbourne and in Canberra in April, 1929.

At the inaugural meeting in Brisbane speakers had given the impression that their efforts in the campaign against cancer in Queensland were but a part of a Federal Australian movement which from that moment was to begin in every State. At the commencement of their movement in August, 1927, beside excisional surgery, there had been two other modes of treatment which had considerable vogue in the endeavour to cure cancer, X rays, ordinary and deep, and lead. They had told their audiences that steps would be taken in certain country district hospitals to facilitate all methods of dealing with the disease. It had been found that medical men in the districts referred to desired an X ray equipment. There appeared to be no doubt that in Queensland there was much to be done with X ray treatment of skin cancers which seemed to be so prevalent in the northern and western areas of Queensland and in Australia generally. There was evidently considerable difference of opinion among Queensland radio-therapists as to the prospects of success with deep therapy for internal growths. It seemed that during the past two years much less had been expected of this form of treatment. In consequence the equipment of X ray apparatus foreshadowed in the early utterances of speakers on behalf of the fund, had not been provided. Nor should they be, if no advantage was to be expected by their use. Definite decision, one way or the other, should be determined by a meeting of men skilled in the use of such apparatus and at an early date.

Various forms of lead had been given considerable trial in a number of patients, but with no good results. It had therefore been abandoned and had quite fallen into disuse throughout Queensland.

The treatment by radium, which had become deservedly popular in other parts of the world, had made progress in Queensland. Since the Commonwealth radium became available in Queensland hospitals the treatment by radium had overshadowed every other. Country practitioners in various parts of the State were desirous of using it for the benefit of their patients.

It would be readily admitted that the use of any treatment promising so well should be made available to as many doctors and as many patients as possible with due precautions. The main precaution, of course, was that the surgeon using radium should be duly instructed in its technique in the interests of his patients. Surgeons in country and northern districts of this State had but little chance of instruction in its use. Very few of them could afford the time and expense entailed by a prolonged visit to metropolitan clinics. This was detrimental to patients suffering from cancer who came under their care. It had been said that arangerments would be made for patients in the north to come to the metropolis, that things would be made as easy as possible for them to do so. The great objective of early, good and accessible treatment for all sufferers from the disease in Queensland would be thus postponed to a more distant date. They had impressed the public with the need for early treatment. They had had difficulty in persuading country workers to abandon their daily work and at the earliest possible date to secure the necessary treatment. It was a formidable undertaking for any man to leave his family, his work, his means of living, for what is to him a comparatively trivial sore. If he should have to face in addition a long, though cheap, journey of a thousand miles or more, he would find many reasons for postponing his visit to a doctor.

The remedy lay in a multiplication of those who were to instruct the country practitioner in the use not alone

of radium, but in all modern methods of treating cancer. Such instruction should be available in every State and not only in the metropolis, but in many considerable towns of each State. If radium would fulfil in the future what now it seemed to promise, their goal was to make it easily available from Darwin to Perth in Western Australia and from Normanton or Thursday Island to Brisbane in Queensland.

As long as there was only one instructor authorized as director to teach the use of radium, so long would the extension of education in this treatment go haltingly.

This opinion was based on the assertion of radium experts that its use should not be undertaken by practitioners who had not had a long apprenticeship. If it were a matter that a practitioner of average ability and common sense could learn to undertake in a short time, multiplication of instructors or directors would be easy and would soon overcome the difficulties which seemed to surround the subject.

The needs in the Australian campaign against cancer were coordination of the work of each State with every other in the Commonwealth, research into the causes contributory to cancer in Australia, subsidy of work in such research, constant attention in every State of Australia to propaganda in relation to the paramount importance of early treatment and extension of instruction in treatment methods (not only of X ray or radium) which promised hope to patients with cancer.

To secure these ends the Commonwealth Health Department should be urged to hasten a movement for the collection of a fund in each State, as had been done in New South Wales and in Queensland, such fund to be devoted to a campaign against cancer and the Department should be asked to devise a scheme by which a coordination potent for a thorough campaign against cancer could be devised, a campaign in which every phase might be given due position. In April, 1929, at a meeting of the Federal Advisory Committee in Canberra, that conference had suggested that it should meet at least twice annually and be made a means of coordinating the work of the campaign in each State.

It was generally admitted that prevention was better than cure and this applied to cancer. It could scarcely be described as sound policy to spend large sums on treatment of a disease and to refuse expenditure on an inquiry into the causes which produced it. Treatment facilities should be much extended, not only to patients but to members of the medical profession. The tendency seemed to be to put the work into the hands of small coteries of medical men. Opportunities for instruction should be arranged for all surgeons. The more surgeons acquired competency in the use of radium, the better for all concerned. Provision should be made at many more hospitals for surgeons to use radium. There were many good country hospitals throughout Queensland.

The organization in Queensland had done some excellent work. Its fault had been want of coordination in many directions. The organization of the appeal for funds had been well arranged and carried out under the direction of Mr. Hayes, the paid organizer. It had been no small achievement to have collected over £40,000 from private subscribers during a period of depressed financial condition, but even in this regard certain want of coordination, arising from small differences of opinion, had interfered with the results in the metropolitan area. Some of the meetings had been poorly attended and this had been in strong contrast to the attendance in the country. The various branches of the Country Women's Association had been veritable pillars of strength.

The objective should be a paid whole-time director in each State, with each director acting in coordination with all the others. Not much benefit could be expected from the central secretariat which had received regular reports from the Queensland Campaign Committee, until activities in each State were grouped under some complete central Federal organization. There seemed to be danger that all Australian attention would be centred on treatment alone. It was of the highest importance not to lose sight of the preventive side of the matter.

They could not contemplate with equanimity the present incidence of cancer throughout Australia, even though the present rate of mortality might be much reduced. It would be wrong to submit to the present annual expenditure of large sums of money for treatment and to neglect the making of serious effort to prevent the disease.

There should be coincident research into the causes of the disease as they were affected by Australian conditions. So far the activities in Australia against cancer seemed to have fallen short in regard to research into causation and methods of prevention.

Dr. A. A. Lendon (Adelaide) said that on December 12, 1927, Mr. Edward Neale, of Adelaide, had died and it was announced that by his will he had bequeathed to the University the residue of his estate on the death of his widow,

> to be used (with or without moneys from other sources) for medical research in such way as the Council of the University may in their absolute discretion decide and without limiting their choice I express a wish that the moneys coming to them under this bequest shall, if practicable at the time, be used chiefly for research work in connexion with cancer.

It had been estimated that the value of this bequest was roughly £17,500.

In January, 1928, a meeting had been held at Melbourne under the auspices of the Federal Department of Health and a cancer advisory committee had been established of an interstate character, the representative of South Australia being the Chief Quarantine Officer (Dr. F. S. Hone). The objects of the committee had been defined to be the correlation of all activities with respect to cancer and allied conditions and the establishment in each State capital of centres for the treatment of cancer and for research. To these centres the radium purchased by the Federal Government was to be loaned on certain conditions.

In June, 1928, Dr. Hone had brought before the Faculty of Medicine a proposition for the appointment of a University committee, including several persons not actually connected with the University, the duties of such committee being on the one hand to arrange for the supervision of the treatment of cancer at the Adelaide Hospital, in accordance with the principles laid down by the Federal Department of Health, as well as to raise funds for the proper equipment of the cancer department; and on the other hand to supervise the expenditure of funds provided for research, to stimulate public interest in this project and to educate the public as to the advantages of early diagnosis and treatment. The Council had adopted the Faculty's endorsement of this scheme and on July 25 the first meeting of the general committee had been held.

Prior to the establishment of this general committee some work had been attempted in two directions. A grant of £100 had been given by the Sheridan Committee to enable Dr. Brian Swift, who had attended Professor Blair Bell's clinic at Liverpool, to carry out the colloidal lead treatment in suitable cases, the lead preparation being made at the University chemical laboratory. In the course also of Professor Brailsford Robertson's researches on animal nutrition lymphoid tumours had occurred abundantly in mice and these had been investigated pathologically and experimentally by his assistant, Dr. Florence McCoy Hill, whose report was expected to be published shortly.

The University anti-cancer campaign having thus been started, three subordinate committees had been appointed, one to deal with finance and organization, another with treatment and research and the third with education and publicity.

Meanwhile Mr. R. T. Melrose having had heard incidentally that there was no deep X ray therapy plant at the Adelaide Hospital, undertook to raise a sum of money sufficient to purchase and instal the best type of apparatus. Without much difficulty he had collected over £4,000, the

South Australian Government meanwhile undertaking to render a block of the Adelaide Hospital buildings suitable for housing this machine and for the accommodation of the radium clinic as well as for the X ray diagnostic work. It was expected that a suitable machine would shortly be installed.

One of the Federal Government's stipulations with regard to the loan of radium was that a minimum amount of £5,000 should be collected from the public. A women's auxiliary committee had been formed under the chairmanship of the Lady Mayoress (Mrs. Lavington Bonython) and the necessary balance had soon been forthcoming. Subject to this sum being raised and to the State Government signifying its willingness to subsidize it by a similar amount, the Federal Cabinet had promised to make a grant of £5,000 to the committee and this sum had already been paid.

Pending the installation of the deep X ray therapy plant at the hospital, suitable patients had been sent from the Adelaide and from the Children's Hospital to the recently appointed deep X ray therapist, Dr. Stanley Verco, for treatment in private at the expense of the general committee and the results had been very encouraging.

The organization of the radium clinic was not yet complete, but it was hoped that it would soon satisfy the requirements of the Federal Department of Health.

The campaign for collection of funds was entirely in abeyance owing to the widespread depression in South Australia, but it would be resumed at the earliest convenient opportunity.

Meanwhile various bodies of men and women had been addressed and doubtless much interest in the campaign had been evoked.

Dr. Lendon said that he would like to bear testimony to the valuable and interesting work which has been done within the precincts of the University of Sydney. A great deal of money has been raised in New South Wales compared with their trivial amount and a good deal of it was being spent, but the citizens of Sydney and the inhabitants of New South Wales generally might be assured that this money was being well spent and that they could without hesitation reinforce the local treasury when the appeal came. With regard to propaganda work which had fallen somewhat to him, he preached the gospel of hope. He told the people that cancer in the beginning was a local disease and that as such it was curable. The moral lesson was that patients must be sent to the committee or to the doctor earlier.

DR. DONALD I. R. SMITH (Perth) read a statement by Dr. Bromhall. He said that for the purpose of his remarks it was necessary to divide the term cancer research into two parts, the experimental part of research and the clinical part.

The first part comprised laboratory work in its numerous branches; the artificial production of tumours by different means, including chemical irritants, serological examination of cancerous and normal tissues; attempts to transplant tumours from one animal to another of the same species or of a different species and many other varieties of experiment too numerous to mention, but all having as their aim the discovery of the cause or perhaps causes of cancer.

This part of cancer research could not be carried on to any great extent in Western Australia, except by private individuals who had their own laboratories with facilities for research. The University of Western Australia had no medical faculty and therefore there were no pathological and medical research laboratories in which organized research could be carried out. This was only for the present; a new university was being built and in a few years' time it would probably include a medical school.

The study of cancer in the human subject could be and was being carried on as in the other States. Ewing, the great American pathologist, had once said: "There is a growing conviction that to know cancer in man one must study the disease more carefully in the human subject." This branch of cancer research consisted in the diagnosis of cancer or precancerous conditions and their treatment, the taking of careful and detailed notes of the previous medical and general history of the patient, further notes on progress after treatment and correlation of these notes in an attempt to find some factor which might be the cause of the disease. The cause had already been found in this way for the large incidence of skin cancer in Australia.

The first step in the treatment of cancer by radium which had not been used in Western Australia up to this date, had been taken in April, 1926, when on the advice of a member of the honorary staff who had just returned from England, the board of management of Perth Hospital had decided to open a fund to provide radium to be used in the treatment of cancer. The appeal for three thousand pounds had been launched in February, 1927, and the amount needed was oversubscribed by three hundred pounds. With part of this sum one hundred and fifty milligrammes of radium had been bought and had arrived from London at the end of 1927. In April one hundred milligrammes of this amount had been sent to England to be reconditioned into a form more suited to the present day ideas of radium treatment, smaller doses for a longer time. In the meantime the Commonwealth Government was going ahead with its scheme for establishing radium centres in all the State capitals, and on June 8, 1928, an intimation had been received from them that they would lend radium to Perth Hospital. Later they had generously offered to give five thousand pounds towards the establishment of a cancer clinic at the hospital, if the State Government would give a similar sum and a further five thousand pounds could be obtained by public subscription. Before the end of 1928 the amount raised, inclusive of the Government grants, had been eighteen thousand two hundred and ten pounds. This sum was to be used to build a new block of buildings in the grounds of the hospital, comprising X ray and radium departments. This was to be a two-storey building with four X ray rooms on the ground floor, two of which were to be used purely for radiographic work, while the others could be used for screening and light therapy. In addition, on this floor there would be a waiting hall, film developing and drying rooms, secretary's office, laboratory and library and demonstration room combined. In the upper storey there would be two wards, one for six women and the other for five men, dressing rooms, treatment cubicles and an examination room for radium patients, an operating theatre and the strong room for the radium. In addition the deep X ray therapy plant would be on this floor. When this laboratory was finished, all the sections belonging to radium and X ray work would be prepared there and blood counts done on workers and patients. It might also be possible to carry on some experimental research there.

In the meantime, while they were waiting for this building to be completed, the work of the department was not at a standstill. In the present X ray department there was a superficial therapy plant and during the twelve months ended on June 30, 1929, fifty-nine patients had been treated, including thirty-eight with cancer. The Commonwealth ration of radium for Perth had arrived on March 8; together with its own supply they had at the hospital 493 milligrammes, a quite large amount for so small a population, which numbered just on four hundred thousand. Of this number more than half lived in Perth and Fremantle and their suburbs and the rest were scattered throughout the State, some more than two thousand miles away. Many people who should come for treatment, were unable to do so for monetary reasons. One old lady who had been seen here a month or so previously, had had a very deep rodent ulcer, just beneath the lower lip, nearly eroded through into the mouth; when asked why she had not come for treatment before, she had said that she could not afford the fare which was considerable. Those who had had treatment, were often unable to return for further examination for the same reason. In these circumstances, however, the country doctors gave great assistance, as they saw the patient from time to time and reported progress. The doctor was often many miles away and it was difficult to persuade the patient that a visit to a doctor at stated intervals was necessary for his safety.

Since the Commonwealth radium and special case sheets for radio-therapeutic centres had arrived in Perth in March, less than six months before, 130 patients had been treated, receiving in all 163 treatments. Of this number 71 had been suffering from rodent ulcers and seven from squamous epitheliomata. In the case of the epitheliomata and one of the rodents the diagnosis had been clinched by microscopical examination. The rodent ulcers had not been submitted to microscopical examination for two reasons. The lesions were often so small that to excise a piece for section would have left nothing to be treated. In the next place the hospital had been without a pathologist since the end of March. In the future, however, they hoped to be able to examine many more tumours. These two classes formed a large proportion of the whole number of growths treated. He did not mean to infer from these figures that the proportion of skin cancer to total cancer cases was as high as it appeared; there were naturally hundreds of patients with cancer who did not come for X ray or radium treatment as the growths were more suitable for treatment by other means.

Professor Wild, of Manchester, a dermatologist in that city, in a lecture given in 1927 under the auspices of the Manchester Cancer Research Committee, had said: "It will be noted that the proportion of the skin cases to the total cases of cancer varies considerably in different countries." It would be interesting to know if he had included Australia in his calculations. Dr. Smith did not know if there were any statistics published in Australia concerning the incidence of the different kinds of cancer and the relation of skin cancer to the total. In an article on facts about cancer in Australia by the Director-General of Health in the May issue of the *Journal of the Cancer Research Committee* of Sydney it was noticed that the total number of deaths from cancer in Australia in 1926 was 5,700, of which 214 or 3·7% were deaths from skin cancer. In Professor Wild's lecture he gave the percentages of deaths from skin cancer compared with deaths from other forms of cancer as 3·7% in the United States of America, 2·0% in England and Wales, 1·5% in Switzerland and 1·2% in Japan and 0·67% in Bavaria. Thus, according to these figures Australia and the United States of America had the same percentage of deaths from skin cancer as compared with deaths from other varieties. He stated that the proportion of skin cancers was probably higher in Australia than the death rate indicated, as the type of skin lesion chiefly seen was not the variety which became attached to deep tissues and bone, eroding everything before it and causing death from cachexia, but the more superficial variety which grew more slowly and often cleared up with one or two treatments.

In The Medical Journal of Australia of June 18, 1927, there was an article on rodent ulcers by Dr. Molesworth, of Sydney, which explained this prevalence of skin cancer. He believed that it was due to the action of concentrated sunlight unfiltered by cloud on the skins of people who were accustomed or whose forbears had been accustomed to the shorter hours of sunshine and the grey skies of the British Isles. As a comparison between the two countries the following statistics might be of interest. In the annual report of the Manchester and District Radium Institute for 1928 it was stated that one hundred and twenty-two rodent ulcers and twenty-two skin epitheliomata were treated there during the year, that was 144 skin cancers in all. In Perth 78 were treated in just under six months, that is at the rate of 156 a year. The figures were practically the same, but the numbers of the populations served by the two institutions were very different. Manchester had a population of about a million, while that of the whole of Lancashire, with its many large towns, was about five million and there were always a few patients coming in from the surrounding counties of Cheshire, Westmoreland, Yorkshire and North Staffordshire, as there was no other radium institute outside London, although different doctors in parts of the country own private supplies of radium. Thus the Manchester Radium Institute drew its patients from an area which had a population of over ten millions. It was only fair to add, however, that Manchester and Liverpool each had a skin hospital where many patients with skin cancer from these districts were treated. The figures at the Manchester Skin Hospital for 1926, which were the latest available, gave 164 cases of skin cancer. Even with this number to add to those of the Radium Institute the proportion of cases in that part of England was much smaller than the proportion in Western Australia.

Of epitheliomata of the lip there had been nine cases in six months, that was eighteen in the year, as against fifteen treated in Manchester at the Radium Institute during the last twelve months. All the epitheliomata of the lip seen were on the lower lip, thus bearing out again Dr. Molesworth's statement in his article that carcinoma of the lip might be caused by the sunshine. Of the other kinds of cancer seen at the clinic in the last six months it was difficult to say anything, as the numbers of each kind had been so small. Of the methods employed in treating cancer by means of radium there was no need to speak, as the discussion was on cancer research and not cancer treatment.

After he had completed the reading of Dr. Bromhall's communication Dr. Donald Smith said that he wished to add a few words of his own in regard to the radium treatment of cancer in the State of Western Australia. The treatment was in its infancy, but he wished to take this happy opportunity of assuring Congress that it appeared to be a very healthy baby. With the new department which was to be opened in 1930, a serious attempt would be made to treat conditions in a small community like theirs rather than to discover their causes, although they might help. Treatment with radium and by surgery would be the lines worked upon. One patient came in less than six months before with cancer in the mouth, which they had treated with radium. The patient was apparently quite well and promised to remain so and the scar in the mouth presented practically no deformity. It was their intention to try to attack the scourge of cancer by using the three main means at their disposal as a guarantee rather than as competitive effort.

Dr. Gregory Sprott (Tasmania) said that he was afraid that he could say very little in regard to cancer. They in Hobart had a public hospital and as his audience knew, they hoped that a reconciliation would be made with the Government and that the medical profession would again come into its own and undertake the work of the public. He did not want to say anything about the present management, because they were all well acquainted with it and it would be undesirable, perhaps prejudicial to the interests of the profession to say anything more. The Commonwealth Health Department had come down to Hobart to distribute some radium and he believed it had given a certain amount to that hospital. He did not know what was being done there and he did not think any of the members of the British Medical Association knew very much; probably the Health Department required certain statistics. There had appeared in the local press a very wonderful statement about the number of cures of cancer, but the men who were in active practice there, were not as optimistic about the cures as the report implied.

Dr. A. Burrows (Canberra) said that as he came from Manchester it would be wise to correct a rather wrong impression that Dr. Bromhall had given about skin cancer in England. He had made a comparison between the numbers treated at the Radium Institute at Manchester and the numbers treated at Perth. It was perfectly true that there was more skin cancer in Australia than in England, but it was also true that there was much more skin cancer in England than they thought. They would find the point which was of most interest was the high proportion of squamous-celled carcinoma. The high proportion was due to the peculiar conditions of industry under which they worked, with soot and coal dust. As far as the figures were concerned, England was a highly organized country, but the Radium Institute did not cover the whole of the work in their district. Practically every skin clinic has its small piece of radium for treating. Their work was largely investigational, but many patients were being treated by them. Some of the tumours were excised and other methods of treatment were used, so that

the comparison given was rather fallacious. There was a much larger proportion of skin cancer in England than the figures would indicate.

The lines of endeavour and development in respect to cancer that had been set out before them by the representatives of the various States beginning with Dr. Sandes, gave them an illuminating account of the many things which had been done during the past two years in the various State capitals and elsewhere. Any disinterested observer could not help noticing the vein of common object and attainment which ran through the whole of these discourses. This common factor might really be described as the national factor. For several years the Commonwealth Government had been endeavouring in as many ways as seemed practicable to foster cancer research and treatment in Australia. During a considerable period the encouragement of cancer research had taken the form of subsidizing promising lines of work and recognized individuals and institutions. Along this line help had been given to the Walter and Eliza Hall Institute in Melbourne in investigating certain of the serological aspects of cancer largely with the object of obtaining a reliable serum test. In Melbourne through Dr. Kellaway Dr. Searby had been encouraged to make an investigation of the end results of the cancer patients treated at the Melbourne Hospital during a period of years. This work had been completed and had brought out one aspect of cancer work which the Federal Government had always endeavoured to emphasize, namely the working out of a proper follow-up system for cancer patients who had been treated. A subsidy had also been given for several years to Dr. Cherry to assist him in a type of cancer research work which had been furthered by responsible people; as far as he knew no complete attempt to do a similar piece of work had been made before. Dr. Cherry's recent publication on the subject was a justification of public action in the matter.

Dr. Sandes had already outlined the work which has been done in Sydney, but in the early stages before the big cancer appeal had been made, the leading spirits of the movement thought that the support of the Commonwealth Government would enable them to approach the public with more confidence. Before the actual appeal £2,500 had been granted by the Commonwealth Government to Sydney University to help it to carry on its cancer research work. When the subject of the appeal was broached. the Government felt that the help it might give in the form of a donation of £5,000 would be of very material assistance in the promotion of cancer work in the most populous area of the Commonwealth and that at the same time it would encourage the public to subscribe for the same object.

In Adelaide subsidies had been given to Professors Brailesford Robertson and Woollard to carry on certain investigations which had a bearing on cancer and more particularly had lately turned upon the influence of diet in the production of certain lymphoid nodules in animals. This line of research was full of interest and promise.

Certain work was being carried on in the Commonwealth Serum Laboratories in Melbourne. It was of a serological nature and the observations and experiments to be made on this question were likely to spread over a considerable period of time, so that no positive results could yet be given.

The statement which he had made, had really been only a very small part of the activities of the Commonwealth Department of Health in the matter of cancer. Naturally in considering the problem the Department was concerned a great deal with what could be done in Australia of a practical nature which would mitigate as far as modern knowledge rendered possible the evil of the cancer menace; such work would not naturally be of a static character, but would move along with the progress of medical science. In considering the position along the line of practical endeavour certain possibilities were open to the Government and the two most important ones were those of providing means of obtaining an early diagnosis of cancer and to every member of the community when necessary the opportunity of obtaining the latest and most up-to-date forms of treatment. In respect of the first item the most important thing, even when the question of public propaganda was considered, was the provision of adequate facilities for the early examination of specimens of tissues of doubtful significance. These facilities were naturally largely available in the big cities already, but as far as the smaller towns were concerned, the Department of Health had done a great work in providing health laboratories for the examination of pathological specimens in various parts of the country. The second item which involved the provision of the most modern type of treatment for cancer, had largely centred round the purchase by the Commonwealth Government of ten grammes of radium. This purchase was well timed. Modern research and experience had established beyond doubt the value of radium in the treatment of cancer. No doubt its exact position in cancer therapy remained to be defined, but in certain given aspects of the disease it was probably the treatment of choice.

The exploration of these points together with an investigation of the value of radium in all forms of cancer in all possible positions represented a gigantic piece of research work which was actually going on throughout the whole of Australia at the present time. The purchase of radium had been particularly valuable in that it had tended to focus the interest in cancer treatment and research which had been steadily growing in Australia for some time upon certain definite tangible aspects of the work. An early meeting of a committee of prominent people interested in the subject of cancer had laid down the principles of the organization along which radium treatment and with it cancer research should develope. These lines had been closely followed out. The Department of Health had been able with the assistance of the local authorities to establish in every capital city a cancer and radium treatment centre organized on the most modern lines. At each of the centres besides a modern and up-to-date technical equipment being provided, a number of the leading specialists who had become particularly interested in radium treatment, had been directly associated with the work under the leadership of a general director or organizer. It should be emphasized that the object of the Government was to provide a national system by which every member of the community could obtain cancer treatment of the highest class. Up to the time of the latest developments skilled surgical treatment was already available. What was necessary was the provision of other services. The most up-to-date treatment could not be provided at every small town and to do this straight away would be a negation of the whole system of providing the best treatment possible. Good radium treatment could be given only by experts and for this reason it had been in the first instance the aim of the Government to establish in every capital city at least one properly equipped modern, competent clinic to which the sick patients could go with confidence.

This movement had a common national purpose running throughout it and what had welded the system together into a coherent whole was that by the provision of a common system of note taking and classification of cases the Department of Health had been able to establish a system by means of which Australia gave the world an almost unique example of a community carrying out a nation-wide experiment.

The Commonwealth Government had recognized the assistance which it had received in this matter from the local authorities and viewed with appreciation the efforts which had been made in various parts of the country to raise funds for the prosecution of the cancer movement. It had been able to give a donation of £5,000 to each of these funds. In each case the State Government had associated itself with the Commonwealth Government in making a similar gift. The public had responded well to all appeals. In Victoria and Tasmania appeals had not yet been launched. In Victoria an organization was in the progress of establishment for that purpose. Thus all parts of the community, the Governments, Federal and State, and the public, medical and lay, had contributed towards the making of a great national cancer research and treatment scheme.

It was thought that another work of research should be carried out upon the use of radium emanation in the treatment of cancer. A Commonwealth central radium emanation laboratory had already been established. It would be available to supply emanation to any approved person in the country while arrangements were being made to establish other emanation laboratories in Sydney and most of the other capital cities of the various States if thought advisable. Radium emanation occupied a unique place in cancer treatment inasmuch as it had little or no intrinsic commercial value. It was of great value as a form of application of radium particularly in difficult circumstance as its containers were very small and there was no necessity to attempt to withdraw the emanation after it had been applied.

The French technique for the use of radium had come so much to the fore that it was thought by many to be the only method of using radium. In consequence of this many of the excellent qualities and great advantages of radium emanation had been overlooked. An effort was being made throughout the whole country to demonstrate the value of the use of radium emanation for certain forms of cancer and as a method of providing radium treatment to the more inaccessible patients who were not in a position to make a journey to a main centre. The advantages of emanation from several points of view were so manifest and so important that there was no doubt that the provision of emanation was a matter of the greatest medical significance and was destined to be one of the most important movements in Australian medical history.

At the same time the Commonwealth Government had obtained a special international radium standard which was guaranteed by the greatest authorities in the world as being absolutely accurate in its measurement. This Commonwealth standard was established in Australia and was available for the measurement of any samples of radium sent from anywhere in the Commonwealth provided the necessary conditions which would be laid down in due course were fulfilled. This international radium standard was the only one in the southern hemisphere and by this means Australia took the lead in the southern half of the globe in providing facilities for the provision of guaranteed radio-active measurements.

The latest forms of X ray apparatus for the treatment of cancer had been provided out of funds locally raised together with other modern electrical appliances.

It was perhaps rather a pity that lead treatment had not so far as this and certain other countries were concerned fulfilled all that was promised, nevertheless a certain amount of experimental work had been done in the treatment of patients by this means, although results had not been promising. Other aspects of the treatment of cancer were in the process of exploration particularly at Sydney and Melbourne and the country as a whole was roused to a feeling of the sense of importance of investigating any promising line of treatment or other research in respect of cancer. It could, therefore, be said that in Australia a nation-wide organization had been developed which provided facilities for the most up-to-date treatment for cancer patients and the nucleus in laboratories and funds for carrying out as fully as was possible investigations into any problems which might improve the treatment of cancer and give a greater possibility of discovering the causal factors.

The Commonwealth Government had been able by its various organizations to help in this work. It had been able to advise, assist and suggest the various forms of organization especially in respect to radio-therapeutic treatment and was prepared in the future to consider any reasonable project which might be put forward to alleviate the cancer scourge.

In the absence of a known cause of cancer it was impossible to speak too definitely of the future, but it was obvious that every endeavour must be made to keep Australia abreast or ahead of modern scientific development.

Investigations must be initiated into the immediate causes of cancer. Much work could and was being done in this respect in relation to various industries. All causes of chronic irritation in normal and abnormal life must be investigated and removed. This represented a very large but a very practical problem.

The public, particularly the children, should be educated in all matters of hygiene, particularly those the neglect of which led to the development of cancer.

As many laboratories already existed, young scientists who had the gift for research, should be sought out and be given the means of training themselves, but the cancer and other laboratories founded by the Government and other authorities must be kept in full and productive working. Meanwhile opportunities for team work between the chemists, physicists, biologists, veterinary surgeons and the medical practitioners should be considered and fostered.

In diagnosis and treatment the national side of the work should be borne in mind and every endeavour made to increase the scope and efficiency of the cancer clinics which had already been started. All new forms of treatment should be tested and facilities for doing so provided. Improvements in technique both at home and abroad should be sought and practised. Never in any circumstance should the staff of a cancer clinic be content with its work. It should be possessed of a divine and restless discontent ever seeking new things and ever rejecting old, but withal developing a balanced judgement, so that the public could obtain the best or better than the best service.

This state of things could be brought about only by public approval and national effort, the scientists providing special knowledge and thought, the public money and management, while the Commonwealth Government could as it had endeavoured to do so far, provide national organization and help.

Sir Louis Barnett (Dunedin), on being invited to speak, said that he had not the least idea why New Zealand had not been asked to take part in this particular discussion on the same lines as representatives of other States. He had no doubt that there was some reason, but New Zealand had not come prepared to make any formal demonstration of the position there. As New Zealand was called upon and he was the oldest member of New Zealand present, he had been asked to say from memory what he could about the position there. It would relieve his audience to know that as his memory was not particularly happy, he did not propose to say more than a few words.

They were very much in the same position as the less populous States of Australia in regard to their cancer control efforts and if they had as much financial assistance as Sydney and Melbourne, they would be quite as forward in this respect as these States were. Like the Australian States they had had in New Zealand for many years individual practitioners with a little radium doing a certain pioneering work. The organized hospital work which had begun in Dunedin, had started at least fifteen years previously and had been in progress ever since. From time to time money had been raised, but it had never amounted to a very great deal. There was this special point of difference between the efforts in New Zealand and those in the other States, that they had in New Zealand four large centres of population and each of them, just within the last few years, wished to have a radium department. They had raised funds and sought Government subsidy and the Government subsidy was limited. The Government was not particularly flush with funds and although the spirit was willing, they had not the means to support in each of the four centres an adequate radium department. They had been in consequence rather starved, but they had made definite efforts quite in a similar direction to those elsewhere. They had a cancer campaign started with headquarters at Wellington, under the patronage and with the actual cooperation of His Excellency the Governor, well supported by the citizens and they had great hopes that they would be able to come into line with even New South Wales and Victoria. The question of the different subjects or the

different directions which cancer control might take, was, of course, one of great interest and it pleased him particularly to hear from the speakers that the research into the ultimate cause of cancer was not recognized by any means as the be-all and end-all of the campaign. For many years the cause of cancer had been successfully followed, but very many other valuable lines of research had been and should be adopted. Many years previously he had seen the late lamented Louis Pasteur at his research work on hydrophobia, which was a very serious scourge at that time. Pasteur had never discovered the essential cause of hydrophobia, but by his research work he had practically eliminated hydrophobia as a menace in those countries in Europe where it had been so prevalent before. That was just an example to show that it was not absolutely necessary that the essential cause should be discovered. He had been approached on more than one occasion by people who proposed to leave money in their wills or to give money for cancer research and they had always had this same sort of idea in their heads; was it any good, were they ever going to discover the cause of cancer? They wanted to do something for the public welfare and they did not want to waste money. They sought his opinion as to whether it was any good giving money for cancer research. That was the sort of idea that they wanted to regulate. They wanted to explain to the people that although they were working at cancer research they were working also for the reduction of mortality, for the lessening of the incidence of cancer and for the betterment of the condition of people suffering from cancer. In their propaganda they should put it forward that whether the cause of cancer was discovered or not they were making efforts that were successful and would be increasingly successful in checking the ravages of cancer.

Dr. H. G. Chapman (Sydney) said that during the past five years a team of investigators had gathered in Sydney to learn more of the actions of radiations upon living matter. The Senate of the University of Sydney had approved of a systematic attempt to inquire into the ways in which certain radiations brought about changes in tissues in the hope that these studies might lead to greater efficacy in the radio-therapeutic treatment of new growths. Study in Sydney had been mainly confined to those electromagnetic waves of exceeding frequency and of minute wave length commonly called X rays. These radiations were regarded by physicists as similar in many ways to the rays of light and heat, akin to the long wave length used in radio transmission and to the chemical rays emitted by certain lamps. They travelled through space at the same speed as light, namely, at 180,000 miles per second. They differed in the high frequency of their vibration. As a consequence they moved with more or less loss through solid objects. Not only did they travel through the cells of the tissues, but they passed through the individual atoms which made up the compounds of which cells were built. These short electro-magnetic waves had been used by physicists for thirty years to examine the structure of matter. They had proved to be among the most potent agencies yet employed for this purpose. In the hands of Rutherford, Bragg, Lane and Moseley they had served to elucidate the atom and to make the early years of this century famous in the history of physical science. As the rays traversed matter, a certain quantity of radiation disappeared or was adsorbed in the matter. Biologically, it would seem as if the proportion of radiation adsorbed into a tissue was that which produced physiological change. This adsorption was due to the atoms which took up the radiation. Sir William Bragg, at one time Professor of Physics in the University of Adelaide, had shown that the amount of radiation adsorbed depended on the density of the element, the adsorption being proportional to the fourth power of the atomic number of the element. Therefore, the adsorption by a heavy element, such as lead with atomic number 82, would be 50,000 times that of a light element, such as carbon with an atomic number 6. In this connexion it should be noted that adsorption was considered in respect to a single beam of rays. Where several beams of rays of different wave lengths were concerned, the quantities adsorbed depended on the wave lengths of the respective beams and on the chemical nature of the substance.

The valuable experiments of Dr. W. Moppett had revealed the wonderful fact that a beam of rays of so few adjacent wave lengths as to be termed homogeneous, might be as active as a mixed beam several thousand times as powerful physically. Dr. Moppett had applied homogeneous radiations for thirty to sixty minutes to the chorio-allantoic membrane of the chick embryo of about seven days' incubation. He had noted that radiation with some wave lengths led to an atrophy of the cells of the membrane, complete in ninety-six hours and that radiation with other wave lengths led to active multiplication producing hypertrophy. These wave lengths lay between 0·2 and 1·0 Ångström unit. Thus, radiation with a beam of 0·52 Ångström unit led to atrophy. Radiation with beams of wave lengths of 0·40 and 0·60 Ångström unit appeared to be devoid of biological activity in intensities at all similar to those employed in producing changes with active wave lengths.

The measurement of the energy falling on these surfaces had been undertaken throughout these researches. The quantitative character of the work had given to it additional value. In these experiments results had followed the radiation for thirty minutes with rays of about 0·52 Ångström unit, with an amount of energy as minute as $1{\cdot}8 \times 10^{-8}$ calories per square centimetre per hour. This energy was less than that which fell from a match on a square centimetre of surface ten metres away. It was less than the minimal amount of light which excited a sensation on the human retina.

It had been noted by Dr. Moppett that the simultaneous application of beams of radiation with antagonistic action on tissues led to no biological effect on the chorio-allantoic membrane of the egg. Likewise the simultaneous application of a beam of homogeneous radiation of a biologically active wave length, together with the application of a radiation of an inactive wave length, led either to a diminution of the biological effect or to no biological effect whatever. Again, the simultaneous radiation of a homogeneous beam of an active wave length, together with a mixed beam of radiation, was without biological activity. Dr. Moppett was also of opinion that the prior application of a mixed beam of radiation to the tissue prevented or diminished the subsequent biological effect of an active radiation. The biological effects of homogeneous radiation had not only been observed upon the chorio-allantoic membrane of the chick embryo, but had been confirmed by observations on mammalian tissues, especially on the mouse.

Dr. Moppett had noted that several homogeneous beams of rays were potent biologically. The physicists in the Sydney team had observed these wave lengths to be the discontinuities in the adsorption of rays by lead, uranium and molybdenum. In other words radiations of these wave lengths were adsorbed in greater amounts than other wave lengths by these metals. Chemical analyses had shown lead and uranium to be present in the eggs used in these researches. Miss Winifred Mankin had devised a method which had shown for the first time molybdenum as a constituent of living tissues.

During the last few months Mr. W. H. Love had succeeded in showing that uranium was present in the chorio-allantoic membrane of the chick embryo and that this uranium had adsorbed a measurable amount of the radiation of wave length 0·52 falling on it. When it was remembered that a square centimetre of the chorio-allantoic membrane weighed less than 0·0001 milligramme and that the membrane contained less than one part by weight of uranium in one million parts of the membrane, the high degree of skill needed in this work was remarkable. Evidence of a similar character had been obtained in respect to lead. These adsorption phenomena had been confirmed by an examination of the X ray spectrum of the ash of the chorio-allantoic membrane.

It thus appeared that there was evidence that the heavy metals led to an exceptional adsorption of radiations of certain wave lengths. Whether this adsorption was connected with the biological results remained to be proven.

No information whatever seemed to be available as to the manner in which biological changes were brought about by the adsorption of energy derived from X rays or from the γ rays of radium. Physiological effects were ascribed to chemical reactions, such as the oxidation and reduction of glutathione or to the sequence of chemical reactions such as those constituting the hydrolysis and oxidation of glycogen in muscle with the production of lactic acid and the synthesis of glycogen. Other physiological actions were explained by the physical processes of diffusion, osmosis and so on. No guide was yet available as to the result of adsorbing the energy of X rays.

A study had been commenced in Sydney to ascertain whether the properties of lead as a catalytic agent were altered by the absorption of X rays. In this connexion it would be noted that Millikan claimed that two electrons had been driven from some of the lead atoms in the preparation of colloidal lead. The study of the catalytic effect of lead might show that the figures available denoted that radiated lead would influence the effect of autolytic reactions in tissues.

Attention had been directed in Sydney to the way in which radium brought about the disappearance of new growths. As was well known there existed evidence that other processes were concerned, beyond the immediate action of β and γ rays from radium upon the constituents of the malignant cells. While a considerable weight of cancerous tissue was undergoing absorption, it would seem that immunological processes were taking place within the body. Those processes might be considered to explain the difference observed in the ultimate results of the treatment of certain sarcomata of bone in the leg by amputation and by radium. Researches had been undertaken in Sydney to ascertain whether immunization could be produced in the human subject by the injection of proteins of tumours. When a foreign protein was introduced on a number of occasions into an animal, the first immunity response was of a biological or specific character. Thus the introduction of the casein of cow's milk into a rabbit produced antibodies for practically all the proteins of the cow. If, however, the injections were numerous, a chemical immunity could be observed in which the antiserum reacted with the caseins of many species of animal. In immunizing a person against the growth in his own body, it would appear impossible to immunize against the biological characters of human proteins, but there appeared to be no reason why antibodies should not be produced against the chemical qualities of the proteins of the tumour. Evidence was accumulating that antibodies could be produced against the proteins of multiple melanotic sarcoma of man.

Dr. L. M. McKillop (Brisbane) said that when it was recalled that no less than 82,687 persons had actually died from malignant disease in the Commonwealth of Australia between 1907 and 1926 and that of these deaths a considerable proportion had been caused by growths involving the uterus, lip, tongue and floor of the mouth and the skin covering, he might be pardoned for asking whether a lot of this life wastage could not have been avoided. The late King Edward, upon the occasion of the opening of a tuberculosis wing of a London hospital, asked of consumption: "If preventible, why not prevented?" And precisely the same question could and was being asked regarding cancer. Was cancer preventible? In certain situations in the body it was. Unfortunately there were certain situations in which for anatomical or physiological reasons the onset of a malignant process sealed the patient's doom from the very beginning. He referred particularly to cancer of the gullet, the pancreas and the body of the stomach and to the acute periosteal sarcomata. Fortunately, however, many malignant processes were preceded for months or even years by a condition of the particular tissue in which the stage was, as it were, being set for the development of the cancer. He referred to the definite premalignant conditions of which there were now know to be many.

During the past few years the conviction had been growing that as a profession they were not doing all they could and should in the matter of preventing the development of such cancers as they knew to be definitely preventible. What and where were those premalignant conditions? Speaking generally, they were found upon the surface of the body and in the cavities which opened upon the body surface, the mouth, vagina and rectum. Included in this generalization were cancers of the skin including epithelioma, rodent ulcer and melanotic cancer, cancer of the lip, tongue and floor of the mouth, cancer of the breast, rectum and *cervix uteri*. It would be futile to pretend that all cancers in these sites were preventible, but he felt that it could be shown after a little consideration that many such cancers were preventible. Cancer of the uterus arose far more frequently in the cervix than in the body, far more frequently in *multiparæ* than in *nulliparæ* and far more frequently in those parous women who for months or years had had cervical tears left untreated than in those parous women whose lacerations had been repaired. It could not be denied in the light of clinical experience that an almost essential prerequirement for the successful establishment of a carcinoma of the uterus was a neglected laceration voiding a leucorrheal discharge for months or years. From a purely pathological point of view this premalignant condition involved the eversion of the lower group of columnar cells. Exposed to the constant taunts of the altered and infected vaginal secretion these cells attempted to mimic the stratified epithelial cells and in the attempt atypical mitoses occurred, finally ending in the reversion to embryonic growth and consequent malignancy. In Queensland alone between the years 1909 and 1928, no less than 956 women had died of cancer of the uterus. Over 90% of these developed the disease in the cervix and practically every one of the latter group had borne children and subsequently suffered from a leucorrhœa. If they were to effect a diminution in the incidence of cancer of the cervix, why in the name of common sense did not they preach the doctrine of the necessity for periodic pelvic examination of all multiparous women with leucorrhœa and the prompt and proper repair of all cervical lacerations? Herein as elsewhere they had to rely upon the vigilance of the family physician. It was the unfortunate lot of the specialist to see far too often cancer in an advanced or hopeless stage. Principally for personal reasons he had for many years taken a deep interest in cancer matters and he had very often been greatly discouraged at seeing the entirely hopeless condition in which some patients came for treatment.

Since occupying the position of chairman of the treatment committee of the Queensland Cancer Trust, he had had more and more opportunities of seeing some of these tragedies of cancer, often in quite young women.

Malignant disease about the mouth was far commoner in men than in women. In Queensland between 1909 and 1928, 580 men, but only twenty-six women, had died of intraoral cancer. The reason for this difference was not far to seek. Women as a rule kept their mouths in a cleaner condition than men, suffered less from broken teeth and pyorrhœa and tertiary oral syphilis and smoked less than men, at any rate until recently. Cancer of the lip, tongue and floor of the mouth was preceded for months or years by a definitely precancerous change in the mucosa —a condition of leucoplakia. Here again treatment by removal or by calibrated dosages of radium of such precancerous areas together with the removal of rough-edged or pyorrhœal teeth and the correction of ill-fitting dental plates, would certainly go a long way towards cutting down the death rate from cancer in this region of the body. Personal hygiene, especially of the mouth cavity, should be taught to children from an early age. In this way, quite apart from cancer, many very serious diseases could be avoided or their effects mitigated. James Ewing tersely quoted the old French saw: *"La mort entre par la bouche."*

Cutaneous cancer was very common in tropical and subtropical Australia. In Queensland in the twenty-year period 1909-1928, 687 males and 265 females had died of it. During the years in which he had practised in central Queensland, he observed many cases. There were

three main varieties: (i) rodent ulcer, (ii) epithelioma, (iii) melanotic cancer. The first two varieties arose almost invariably in sandy complexioned persons whose work condemned them to long periods of sun exposure. Lacking the necessary protective pigment in the deep layers of the skin, the actinic rays of the sun first set up a reactive proliferation of the *stratum corneum*, leading to the definitely precancerous condition called hyperkeratosis. The patches which had a predilection for the ears, neck, cheek and dorsum of the hands, were usually multiple and the malignant growth was often of low grade. Persons of a reddish complexion who were exposed to strong sunlight should be warned to cover exposed surfaces adequately and should have the keratotic patches treated. The small and more recent patches could be treated with carbon dioxide snow, the large and more chronic ones by removal or by surface application of radium. Early rodent ulcers were particularly easy to cure by radium, but if extensive, surgical removal followed by deep X ray therapy was more satisfactory. Melanotic cancer arose from a degenerative phase in melanotic moles. These rough-surfaced, hairy, dark blue moles were really embryological rests and especially if located where exposed to injury or irritation, should forthwith be removed surgically. It was the duty of a practitioner when he found one of these moles, to warn his patient of the possible consequences of any irritation and to advise removal without delay. Embryological rests were just as common in females as in males, so they found little difference in the deaths. In Queensland between 1909 and 1928 eighteen males and seventeen females had died of melanotic cancer.

Cancer of the gullet, an incurable disease, was almost certainly due in some cases at least to a chronically dirty condition of the teeth, tongue or tonsils, added to the habit some people have of bolting hot imperfectly masticated food and strong but inferior alcohol.

In China the father of the family, as was the custom, ate first of the boiling hot food and died later of cancer of the œsophagus. The wife ate later when the food was colder and her gullet was spared.

Lockhart Mummery had shown that there were good grounds for believing that these growths almost always began as papillomata. It was more than likely that stagnation of fæces in a polypoidal rectum would explain many cancers of this organ. The moral was to teach the avoidance of constipation.

Time unfortunately did not permit him to discuss at any length the question of the prevention of breast cancer beyond saying that it was an accepted fact that the disease was almost certainly caused by stagnant secretions irritating the lining cells of the acini or ducts. Consequently it would seem wise to advise nursing mothers not to wean their infants abruptly and to have cracks and infections of the nipple properly attended to. Some breast cancers were undoubtedly due to sudden awakening perhaps by trauma of an embryonic rest in the tissue depths, but there was no way of detecting the presence of these vestigial rests.

Women in whose family history appeared a tendency towards malignant disease, should take special care of their breasts. They should remember that from its anatomical position the breast was especially liable to injury possibly at a time when it was passing through physiological changes which rendered its highly specialized cells unstable.

There were many other considerations he would have liked to place before his audience in dealing with the prophylaxis of cancer, but time did not allow. To sum up, the avoidance of all forms of chronic tissue irritation, the repair of cervical lacerations, the removal of such unstable vestigial rests as melanotic moles and the exercise of strict cleanliness of the skin, the cavity of the mouth and of the rest of the intestinal canal would go a long way in the aggregate towards cutting down the incidence and the death rate of cancer. During his stay in America last year he had spent some time studying the activities of the American Society for the Control of Cancer. They had a great deal to learn from this up-to-date and efficient organization which was doing untold good in the campaign against the disease. He suggested that it was time they had some such society or organization in Australia, seeing that they ranked so high in the cancer death rate for all countries. Were they as a profession doing as much as they should towards the prevention of cancer? He submitted that they were not.

Dr. L. Jona (Melbourne) said that his only excuse for coming before them was that as a former laboratory worker he had been compelled by the economic necessity of earning a living to descend from those ethereal heights of academic work to the plains of general practice, in spite of which he had attempted to carry on his research work. First of all, he would like to protest against this system which seemed to be growing more and more of dividing research into water-tight compartments. They heard a great deal of cancer research, tuberculosis research, syphilis research, research into the conditions of mining or the conditions under which the white man lived in the tropics; all these were treated apparently as if they were quite independent problems. He maintained that it was time that there was a better system of coordination of the research efforts of Australian workers. They should have in Australia a medical research council or a body of an allied nature, something of the nature of the Bureau of Science and Industry, which existed for economic research. Surely they could find three men of the calibre and Julius, Rennie and Richardson, who could coordinate the work that was going on throughout the Commonwealth. A man in Queensland had no idea of the work that was going on in Adelaide, Melbourne or Sydney; very often he had no idea of the work that was going on in his own city. He had had an experience of that himself. He had been doing some work on lead, copper and other metals and he had wanted to determine the effects of these metals on the embryonic cell. He thought that an egg would be a very valuable means of determining it. In 1928 he had got in touch with a poultry farmer near his country cottage and had arranged with him to inject a number of eggs with metallic preparations. He had watched the progress microscopically. Then to his astonishment he had seen a wonderful series of experiments performed in the University of Sydney by Mr. Bishop. He had had the pleasure of meeting him and having a talk with him, and he had learned a great deal from him. He hoped that he would be able to learn more, but he knew that he would have been able to spare himself a good deal of time and effort in that work and in other directions had he been aware of the work that was being done in Sydney. He understood that the Council of the Bureau of Science and Industry coordinated the work of the investigators all over the Commonwealth in such a way that unnecessary overlapping was eliminated. A certain amount of overlapping was always advantageous. The repetition of experiments of other workers, the repetition of work which had been accepted, was always valuable, but at the same time unnecessary overlapping was wasteful and discouraging.

Then there was another aspect of the problem to which he would like to direct a little attention. Sufficient coordination did not exist. They had not the facilities for coordination and team work. In the University of Sydney they were making a start in that direction in this wonderful cancer institute where physicists and chemists worked hand in hand with surgeons and pathologists. That was a Utopia, an ideal condition of things under which they would all like to work. In his own small sphere he had required the assistance of a chemist and he knew sufficient of chemistry to leave it alone, even if he had to pay out of his own pocket for the services of a chemist to make estimations of lead, copper and so on in the preparations which he had obtained.

There were many other aspects of the problem which could be much more effectually dealt with by cooperation and he saw no other way than the establishment of a central bureau or central committee which would control, direct, advise, assist and coordinate the work of the various investigators. There were very many other things he would like to speak of, but that was the only point he

would like to emphasize. He would like to see established in Australia a committee or a council of medical research which would act as an adviser to those who were carrying out research and to assist them in the coordination of their clinical and experimental laboratory work, by indicating where and how the assistance required should be obtained.

Dr. T. Cherry (Melbourne) said that he had been asked by members of the Cancer Research Committee to give a brief account of his experimental work. This would serve as an introduction to the microscopic slides and other exhibits which he had brought to illustrate the results of his experiments with tubercle bacilli. It was found that at an average period of about eight months after the injection of a very small number of virulent tubercle bacilli tumours appeared in very considerable numbers as compared with those found in the control animals of the same strain. Steps which should be taken to insure reliable results with mice, included precautions against chronic diseases which sometimes occurred as epidemics and the inoculation of several hundred animals. Both these points would be dealt with in his paper. The evidence that a given tumour had been produced by the experimental inoculation was strengthened when it was found to be of a type which was rare amongst spontaneous tumours in mice, when it occurred in males as well as females and when it was found close to the point of inoculation. The results of the first series of inoculations had been published a few months previously. They referred to about one hundred mice and suggested that the tubercle bacillus might act as an internal irritant and thus become the essential but indirect cause of the neoplasms, the connecting link being the lymphocytes. The present series covered five hundred mice and would probably clear up the points that had been in doubt. It was of interest to find that several of the early tumours in the series were sarcomata, a neoplasm which as a class was rare in mice. In examining the microscopic slides two points had to be kept in mind: how far were the growths examined definitely neoplastic and how far did they correspond to the ordinary cancerous growths in human beings.

The Sections.

SECTION OF MEDICINE.

Peptic Ulcer.

Dr. C. T. Ch. de Crespigny (Adelaide) based his remarks on peptic ulcer on eight hundred and two persons over twelve years of age treated at the Adelaide Hospital for this condition in four years. This represented 2% of all patients admitted during the period. Twenty-six died from their ulcer, fifteen from rupture, two from hæmorrhage and nine from the operation undertaken to cure the ulcer. Ulcers were found at autopsy in sixty-four out of two thousand bodies. Gastric ulcer was encountered forty times and was the cause of death of sixteen persons. Duodenal ulcer was encountered twenty-four times and was the cause of death eight times. The frequency of peptic ulcer in the Mental Hospital at Parkside was as high as 8%, judged from *post mortem* findings. Dr. de Crespigny was unable to throw any light on the ætiology of either gastric or duodenal ulcer. That the ulcers occurred in several members of one family was a common experience. Although a special habitus was said to be associated with gastric and another with duodenal ulcer, Dr. de Crespigny had been unable to confirm the views expressed in this connexion. He called attention to the frequent association of ulcer and appendicitis. He held the view that the ulcers began acutely and based this opinion on the fact that perforation and hæmorrhage occurred more frequently in the acute than in the chronic forms. He dealt at some length with the diagnosis and maintained that clinical examination, chemical analysis and radiological examination were necessary at times before an accurate diagnosis could be formed. He had found that radioscopic examination with palpation of the duodenal bulb was more valuable than ordinary skiagraphic examination. He discussed the individual signs and the differential diagnosis of both forms of ulcer, illustrating his remarks with clinical notes of patients under his care. He had come to the conclusion that cancer rarely followed gastric ulcer and never followed duodenal ulcer. In regard to treatment he held that medical measures and surgical operation were necessary, but that it was not possible to define the conditions which would yield to the one or the other. He gave as a general indication for surgery suspicion of malignant disease, gross deformity and impairment of function of the stomach, duodenal ulcers with retention of the test meal after five hours, recurrent hæmorrhage and deeply penetrating ulcers. In other conditions he advocated medical treatment to be continued for three months. Sippy's or Maclean's method yielded equally good results.

Dr. James R. Bell (Melbourne) discussed peptic ulcer and the conditions which simulated it. He said that it was necessary to consider how gastric and duodenal ulcer might be distinguished from each other. Most duodenal ulcers might be accurately diagnosed on clinical evidence alone, but a gastric ulcer close to the pylorus was an excellent mimic. Dr. Bell had examined critically a series of cases in which the diagnosis had been established beyond all reasonable doubt. In gastric ulcer the sexes were almost equally represented, but in duodenal ulcer the males outnumbered the females by seven to one. Of the gastric ulcers 30·8% occurred before the age of forty. The symptoms of duodenal ulcer did not compel the patient to seek medical advice as soon as those of gastric ulcer. While epigastric pain was generally present in both gastric and duodenal ulcer, pain was completely absent in 8·3% of the former and in 10·2% of the latter. Possibly those persons with painless ulcers were hyposensitive to painful sensations of all kinds. Vomiting was as common in gastric as in duodenal ulcer. Hæmatemesis occurred in 23·8% of gastric ulcers and in 22·2% of duodenal ulcers. Melæna occurred alone in 4·7% of gastric ulcers and in 11·1% of duodenal ulcers. It occurred in combination with hæmatemesis in 28·5% of gastric ulcers and in 33·3% of duodenal ulcers. In discussing the question of fractional test meals, Dr. Bell drew attention to the fact that so-called symptoms of hyperacidity often occurred in the presence of complete and persistent hyperchlorhydria. In a series of 68 gastric ulcers referred to by Dr. Bell, complete achlorhydria had occurred in 10·3%. The gastric acidity in the majority of cases of gastric ulcer was normal or below normal, whereas in a still greater majority of duodenal ulcers it was above normal. The diagnosis of gastric and duodenal ulcer depended mainly on a typical or at least a suggestive history, together with positive X ray findings. The difficulties were greatest when only the indirect X ray signs of ulcer were present, for these could be caused reflexly by other conditions. The commonest conditions which might simulate peptic ulcer, were functional dyspepsia, cancer of the stomach and disease of the gall bladder and appendix. In discussing functional dyspepsia, Dr. Bell said that caution was necessary lest a diagnosis of gastric ulcer was made on insufficient evidence. He was also quite sure that a preduodenal ulcer syndrome existed. In regard to gastric carcinoma the impartial view was that probably not more than 5% of gastric ulcers became malignant. The majority of cancers of the stomach occurred after the age of forty years. In gastric carcinoma the duration of symptoms was short; in 75·4% of his series the symptoms had been present for only one year or less. Hyperchlorhydria in cancer was dependent not upon the location of cancer, but upon the duration of the malignancy. The presence of free hydrochloric acid in the stomach did not by any means preclude the existence of cancer. Until this fact was appreciated, the diagnosis of the condition would seldom be made while the condition was operable. In regard to the diagnosis of gall bladder conditions, Dr. Bell attached importance to the examination of the blood cholesterol. The normal value was as high as 0·190 milligramme per hundred cubic centimetres. If a value higher than this was obtained, gall bladder disease should be strongly suspected. Allowance had to be made for the other conditions which might produce a rise in this value. In regard to chronic appendicitis, Moynihan's epigram that most gastric ulcers were

found in the right iliac fossa, was sometimes substantiated, but it was more often true that "many cases of chronic appendicitis" were found in the pyloric region.

Professor Hugh Maclean (London) thanked Dr. de Crespigny and Dr. Bell for their papers. He stated that he was unable to add anything to the papers already read. The difficulty was that everything he wished to say had been better said by others. His experience coincided in the main with that of the readers of the papers, but there were certain differences. With regard to the X ray diagnosis of duodenal and gastric ulcer at Saint Thomas's Hospital in London, they had little difficulty with the diagnosis of gastric ulcer, but with duodenal ulcer the conditions were different. The radiographer made films of the patient's duodenum, screened his duodenum and then palpated the epigastrium. If there was pain on palpation, this was considered to be evidence of ulcer. If there was no pain, there was no evidence of ulcer. He quoted the case of a man of world-wide fame concerning whom it was said that he made a correct diagnosis in 95% of cases; he had spent an afternoon at this man's clinic. Eight patients had been seen. He had made one diagnosis. In regard to the other seven he was uncertain. This illustrated the difficulty of making a correct diagnosis of peptic ulcer. Dr. Bell had stated that vascular disturbance was a factor in the causation of peptic ulcer. Professor Maclean considered that this was a factor, but disturbance of the musculature of the stomach was a more important one. Different factors played different parts in various circumstances. He found that achlorhydria was associated with 3% of gastric ulcers. In Australia the conditions might differ from those obtaining in England in regard to the seasonal incidence of peptic ulcers. He quoted a surgeon who had said that he had met with more ruptured ulcers in the winter time than in the summer in Australia. He again referred to the difficulty of being certain of the presence of an ulcer. A woman had been examined with X rays on one occasion and no evidence of ulcer was detected and there was no tenderness. She was examined radiologically on a second occasion again without evidence of ulcer. On a third occasion the result of the examination was unaltered. On that afternoon, however, a duodenal ulcer had perforated. He maintained that it was impossible in the absence of a laparotomy to say definitely whether they were dealing with an ulcer or not. Hyperacidity often existed without an abrasion of the mucous membrane. One patient had had a free hydrochloric acid content of 0·35%. Gastro-enterostomy had been performed and apparently the patient had improved. Professor Maclean then dealt with the difficulties of diagnosis between gall bladder disease and gastric ulcer. The nature of the pain in cholecystitis was different from that in gastric affections. He had often made a correct diagnosis on this point. The pain associated with gall bladder disease came on and stopped suddenly. Pain of ulcer was gradual in onset and passed over slowly. He quoted a case in which this point had helped to decide in the differential diagnosis between chronic appendicitis, duodenal ulcer and cholecystitis. The patient gave the history that the pain had stopped suddenly while he was at a theatre. Professor Maclean stated that he did not wish to go into all the technical points of differential diagnosis. One point of practical importance in the history was a complaint of catching in the breath. This was associated with gall stones, as was also a feeling of constriction in the chest. The usefulness of this symptom had been proved by means of laparotomy. With regard to chronic appendicitis various opinions were held in England. The cases of so-called chronic appendicitis were subacute rather than chronic. He had seen patients with definite gastric symptoms which had been alleviated after the appendix had been removed. In these instances only very slight pathological changes had been found in the appendix. However, appendicitis causing gastric disturbance actually existed and the patients manifested no symptoms of appendicitis in these circumstances. Careful investigation of the history was most important and of greater value than X ray examination. With regard to test meals Professor Maclean used only one-hour test meals. He found that there was a tendency to hyperacidity in ulceration. The result of test meals had not helped as a rule. In his opinion the term hyperacidity was a misnomer. There was some interference with the mechanism of the secretion of acids. This caused symptoms some hours after the stomach was emptied, especially when a patient had a duodenal ulcer. Hyperacidity was not necessarily of pathological significance, because the excess of free acid combined with the protein. The test meal was useful in research, but not as useful in clinical work. With regard to the examination of the cholesterol content of the blood referred to by Dr. Bell, Professor Maclean had had an assistant carrying out examinations for two years, but he had found them of no value. The best test in his opinion was the examination for occult blood. There was no need for a special diet unless the patient was eating large amounts of meat. With the benzidene test the appearance of a blue colour in thirty seconds always indicated blood. Treatment was more important than the differential diagnosis between gastric and duodenal ulcer. Under medical treatment penetrating ulcers often disappeaerd in six or eight weeks. If there was no improvement after a few months of medical treatment, the question of operation arose. Professor Maclean stated that there were two varieties of alkalis, the diffusible, soluble alkali, such as sodium bicarbonate, and the substance which was not dissolved, but acted locally. It was wise to use both. The ulcer healed in the absence of free hydrochloric acid. A powder used at Saint Thomas's Hospital consisted of fourteen grammes of sodium bicarbonate, twenty-eight grammes of heavy magnesium carbonate and twenty-eight grammes of calcium carbonate. Alkalosis tended to inhibit the formation of hydrochloric acid. The diffusible alkalis caused a local inhibition of the amount of hydrochloric acid. Hyperacidity was not an essential cause because the hydrochloric acid of normal gastric secretion could cause damage to the mucous membrane of the stomach. A teaspoon of the powder had been used by a patient every two hours. Pain had come on one and a quarter hours after the powder was given. An analysis of the stomach contents had been made and it had been found that 0·15% of acid was present. This indicated that the stomach was irritable and passed the drug along quickly. It had been found at Saint Thomas's Hospital that half a teaspoonful given every hour for two to three days broke the vicious circle and after that it was sufficient to continue with the powder every two or three hours for a few days. In pyloric stenosis surgery was imperative, but if the patient refused operation, good results were obtained by the use of alkalis. The fibrosis and the œdema of the mucous membrane were lessened and the spasm of the muscle relieved. The results of treatment were most interesting. The method had been in use since 1923 in the medical wards. About five hundred patients had been treated. In 1925 surgeons had adopted the same method. The following figures were impressive. In 1925 there had been one hundred operations for gastric ulcer in Saint Thomas's Hospital; in 1926 one hundred and two, in 1927 fifty-two and in 1928 twenty-one. Up to the time of his departure from England six operations had been performed in 1929. In regard to duodenal ulcer, in 1925 there had been one hundred operations; in 1926 twenty-five, in 1927 thirty-five, in 1928 thirty. In regard to the gastro-duodenal complications, the undoing of gastro-enterostomy was included. In 1925 there had been one hundred operations, in 1926 thirty-five, in 1927 nine and in 1928 eighteen. It was not possible to anticipate from the history and the result of physical, X ray and the test meal examination whether medical treatment would be successful or not, but if medical treatment were undertaken, it should be intensive. Professor Maclean spoke of a patient with no hydrochloric acid and a small amount of pepsin in the gastric secretion. He had given a small amount of alkali and pancreatic powder with success. In conclusion he stated that there was no doubt that the results of the medical treatment of peptic ulcer at Saint Thomas's Hospital were most striking.

Dr. S. F. McDonald (Brisbane) said that it was not the peptic ulcer alone that had to be considered, it was the patient himself. The physician could neutralize the gastric contents. The surgeon could short circuit the alimentary tract. Both these procedures failed at times. He had found that four patients were treated for symptoms to one for physical signs. They were called upon to treat

many more patients for pain in the stomach than for passing blood by the rectum. In war pensioners the nervous disturbance was very pronounced. There were three aspects of the problem to be considered: Was the patient suffering from organic disease, was his disability pensionable, was there any mental element? Dr. McDonald discussed the expedient of short circuiting for the relief of hysterical manifestations. He stated that while some surgeons were inclined to dash in, others hesitated. At Rosemount Hospital, in Brisbane, the patients were seen by a physician, surgeon, psychologist and radiologist in collaboration. It was found that the nervous manifestations of war neurosis especially affected the gastric mechanism. He drew attention to Pavlov's work in connexion with the nervous control of the stomach. The symptoms of an organic lesion were often obscured by nervous manifestations. He recalled the instance of a patient who had been treated at Rosemount Hospital with very little success. He had then been treated by the same medical man in private practice. The improvement had been remarkable. This possibly illustrated the importance of suggestion in treatment. The patient later had a definite attack of gall stone colic and the gall stones were removed, thus showing how an organic lesion might be covered by nervous manifestations. Dr. McDonald stated that in his opinion X rays and test meals were by no means infallible. He quoted the case of a patient with duodenal ulcer in whom there was associated pyloro-spasm. An operation had revealed some gastroptosis but nothing else. With regard to test meals he mentioned that in one patient the results had changed from complete achlorhydria to normal secretion within a week. The nocturnal pain of ulcer could be distinguished from restlessness associated with the anxiety state. A rise in temperature was a rare occurrence in ulcer, was never encountered in a nervous condition, but was present in cholelithiasis. He referred to the morning depression in neurotic patients. In prognosis the nervous factor added difficulties. He recalled that at Rosemount Hospital a successful gastro-enterostomy had been performed for a prepyloric ulcer in a patient with the signs of the anxiety state, but after operation the man still remained a nervous wreck. He emphasized the fact that an operation on any patient with nervous symptoms was unwise unless it was definitely proved that organic disease was present. He did not think that opening the abdomen was justifiable in war pensioners who were not suffering from very definite symptoms of organic disease. Psychoanalysis was almost impossible in the case of war pensioners. It appeared to Dr. McDonald that possibly these methods might be availed of with less difficulty in civilian cases. Dr. McDonald again emphasized the importance of the nervous element in gastric and duodenal ulcer. He drew attention to the importance of suggestion in the treatment of these conditions, instancing the usual procedure that was adopted. The routine examination, the test meal, the X ray examination and a long and carefully planned diet list created a considerable impression upon the patient and his relatives. Then should an operation be considered necessary, more interest was aroused. In conclusion Dr. McDonald said that the nervous factor must be considered, both in diagnosis and in treatment. He laid stress on the necessity of treating the patient early and drew attention to the importance of the physician handing him, if necessary, to a trained psychologist. The surgeon should be called in as a last resource. If the patients were not referred to a competent psychologist, they might drift into the hands of various quacks, qualified or unqualified. He pointed out that the physician had no hesitation in handing a patient with toothache to a dentist or a patient suffering from antral disease to an ear, nose and throat surgeon; why should he hesitate about handing these patients in whom the nervous element predominated, to a trained medical psychologist. Finally, he stated that the outlook was much worse if the nervous element were present.

Dr. H. A. McCoy (Adelaide) said that the radiologist could take interest in this type of patient. He stated that he had investigated a number of the patients mentioned by Dr. de Crespigny in his opening paper from the radiological point of view. The fluoroscopic examination was of great importance and much valuable information was to be gleaned from palpation of the duodenal cap during fluoroscopy. The method had been used with great skill by the late Russell Carman and J. Berkeley and other investigators in Great Britain. He drew attention to the spasmodic incisura and the *Fleck* which he regarded as the sign of a barium-filled crater. He discussed the alleged differences between the incisura in duodenal ulcer, gall bladder disease and appendicitis. It was almost certain that if a *Fleck* were observed, an incisura would be present in the wall of the duodenum opposing the *Fleck*. He had noticed the disappearance of the spasmodic incisura after a short period of medical treatment. He drew attention to the case of a patient that he reported in The Medical Journal of Australia some months previously. In this patient the manual expression of barium from the duodenal bulb, repeated many times, had resulted in the constantly recurring demonstration of a *Fleck* situated within the outline of the bulb. The ulcer in the duodenum had not been associated with an incisura. Dr. de Crespigny had stated that vomiting was not usual when there was no pyloric obstruction, but Dr. McCoy frequently observed pyloric spasm after palpation of the patient for ten minutes. One patient actually vomited. Dr. McCoy took exception to Professor Maclean's statement that radiologists were in the habit of punching the patient's abdomen to elicit tenderness. Dr. McCoy had sufficiently emphasized the point that palpation of the duodenal cap in the radiological examinations was by no means valueless. He pleaded for cooperation between the radiologist and the clinician.

Professor A. E. Mills (Sydney) expressed his sympathy with the last speaker who had apparently misunderstood Professor Maclean. Tenderness on pressure indicated that there was an ulcer present. Radiologists did not diagnose on tenderness on palpation alone. A report was furnished showing the emptying time of the stomach, whether spasm was present or not, whether there was a notch and various other conditions of film and screen examinations. The clinician was provided with a film and was at liberty to come to his own conclusions. He regarded the X ray examination as an auxiliary form of physical examination, but he called attention to the importance of the general clinical examination of the patient. He advised his listeners to follow the practice of Sippy and to take several days as evidence of the patient's reaction to different conditions. In discussing the value of test meals they were on more difficult ground. The results of test meals certainly gave definite evidence of achlorhydria, hyperchlorhydria and the emptying time of the stomach. They also gave other information, but not of such value. Dr. Bell had shown that ulcers occurred without hyperacidity. It was known that 3% to 5% of normal individuals had achlorhydria. Others had a minimum amount of hydrochloric acid; others had hyperchlorhydria. An ulcer might arise in a person with achlorhydria or in one with hyperchlorhydria. Nearly all patients with pernicious anæmia had achlorhydria. Was the achlorhydria due to the pernicious anæmia or was the pernicious anæmia engrafted upon the achlorhydria? Professor Mills had noted that when a patient who previously had pain, suffered from hæmorrhage, he lost that pain. He discussed the relationship of vomiting and pain. He laid down as an axiom that pain was due to tension. The effort of the pyloric antrum to overcome obstruction, if severe, caused vomiting. In ulcer there was frequently no pain, but there was nearly always a sense of fullness which merged into pain. This might be caused by undue tension as the result of ulcer. Procedures for peptic ulcer fell into three groups. He performed gastro-enterostomy, he cut out the ulcer or he did pylorectomy. Gastro-enterostomy eliminated the acid food contents. The physician achieved the same object by neutralizing the food. In conclusion he stated that there were patients on whom the surgeons should operate, and those on whom the physician should practise his craft.

Dr. D'Arcy Cowan (Adelaide) spoke of a patient who some time before had been seized with acute abdominal pain while in San Francisco. He had been examined radiologically twice and duodenal ulcer had been found. There had been tenderness in the epigastrium and it had been considered that although this tenderness indicated the pathological process in the duodenum, the diagnosis

was probably appendicitis. The operation had been performed by Dr. Cudmore and acute appendicitis with concretion in the appendix had been found. The symptoms of hyperacidity had been due to an appendix with concretion. Dr. Cowan drew attention to the necessity for care after operation. He stated that he had recently seen a patient complaining of acid vomiting and pain; eleven days after operation he had been given a liberal diet and fourteen days after operation had been put on full diet. The symptoms had been due to lack of after care.

Sir Louis Barnett (Dunedin) drew attention to the dissension between physicians and surgeons with regard to peptic ulcer. The surgeon had the advantage of being able to see and feel the ulcer. The physician on the other hand experienced many difficulties in diagnosing peptic ulcer. He was guided by symptoms and by such tests as the presence of occult blood in the fæces. To make a correct diagnosis the results of X ray examinations must be indubitable. Many cases diagnosed by the physician as peptic ulcer were not peptic ulcer at all. He wished to make a hit at Professor Maclean with regard to the lessened number of operations at Saint Thomas's Hospital during the last few years. Professor Maclean was a man of strong personality and had great influence; he had stated that peptic ulcers could be cured by medical means and no doubt his colleagues would be influenced by his dominating personality and would follow his advice. In Sir Louis Barnett's experience the pendulum swung this way and that way as in every other class of disease. With regard to his own experience in gastric surgery, he obtained good results in 80% of the patients from operation for gastric and duodenal ulcer. There were 20% of failures. Some of the patients in whom surgical treatment was a failure, were no better, some were worse. In conclusion Sir Louis Barnett said that all fair-minded surgeons would be pleased if the physicians had discovered a method of treatment that would be more successful than surgery.

In reply Professor Maclean remarked that apparently his pressure had produced some tenderness. The physician and surgeon apparently did not see eye to eye in these cases. Dr. McCoy had misinterpreted him. The results of his own experience agreed with that of Sir Louis Barnett. However, he felt that the results of X ray examination were not indubitable. However, the disappearance of the crater in gastric ulcer after treatment was well shown in skiagrams. The diagnosis was more difficult in duodenal ulcer. The results of operation were not promising in ulcer. There were two very good radiologists in Saint Thomas's Hospital and their opinions were that it was not always possible to be sure of duodenal ulcer. The method was not reliable in very difficult cases. Professor Maclean mentioned that he had spoken to some leading surgeons about the question of gastro-enterostomy. One was the first to perform gastro-enterostomy in Great Britain. He had sent his nephew to Professor Maclean for treatment for duodenal ulcer. On asking the surgeon about the results of surgery, the surgeon had said that gastro-enterostomy might be good because the patient was treated carefully afterwards. Another surgeon had said that he had looked after his gastric cases and noted many failures and welcomed any method of improving the results.

Dr. Bell in reply referred to Professor Maclean's remarks upon the value of test meals. He had used the fractional method of gastric analysis for nine years and therefore fully appreciated its limitations. The early hope that characteristic results might be obtained in various gastric disorders had soon been dispelled, nevertheless, the method was still of great value when the findings were sensibly interpreted in the light of clinical and other investigation. With regard to blood cholesterol estimations he had long been puzzled by the extreme divergence of the results of reliable investigators. This was the more perplexing as he had come to rely with confidence on this biochemical test in respect to gall bladder disease and he had no doubt as to its value. With regard to the examination of fæces for occult blood, he could not agree with Professor Maclean's statement that it was unnecessary for the patient to be dieted. Unless hæmoglobin containing foods, such as meat and fish, were forbidden for at least three and at times four days, the fæces of most normal healthy individuals would yield a strong benzidine reaction. Dr. Bell's investigations showed that this occurred even in hospital and infirmary patients who had no disease of the alimentary tract and whose diet certainly did not contain over abundance of meat. He considered that the results of medical treatment in duodenal ulcer were most satisfactory, but in many cases of gastric ulcer they were disappointing. In these conditions he felt that the principles of treatment were not altogether logical.

Dr. de Crespigny thanked Dr. Bell and Professor Maclean for their remarks. In reply to Dr. McDonald, in regard to the incidence of neuroses among pensioners with peptic ulcers, his own experience was that peptic ulcer patients were not neurotic, but if peptic ulcer appeared in a neurotic patient, he was apt to manifest the signs of chronic abdominal lesions so well described by Hutchinson. He did not wish to enter into a discussion of the mechanism of pain, as the subject was too large a one. Referring to Dr. Cowan's case of inflamed appendix simulating peptic ulcer, Dr. de Crespigny said that in some of these patients the appendix was not necessarily inflamed, but might be merely bulbous at the tip and deformed. Dr. Cowan was right in emphasizing the importance of after care. In reply to Sir Louis Barnett he said that although duodenal ulcers were difficult to recognize, the therapeutic test was important in that the patients were better within a few days.

Œdema.

Sir Richard Stawell (Melbourne) read a paper on the subject of œdema. He said that in œdema of congestive heart failure and in renal œdema they were faced with the question as to whether persisting œdema was due to a persisting defect of kidney function or whether it was due to an abnormal stagnation of fluid in the tissue spaces. The initial dominant factor in cardiac œdema was right cardiac failure, with rise of venous and capillary blood pressure, making for increased capillary filtration; in renal œdema the initial dominant factor was a failure of the kidney to excrete the necessary amount of saline solution with hydræmic plethora, making for increased transudation into the tissue spaces. There were other factors which caused the persistence of œdema. Sir Richard Stawell referred to the physical and chemical factors causing diminished absorption as set out by Starling and said that if Starling's view of the circulation of the lymph was accepted, the tissue fluid and plasma would have almost the same osmotic pressure and stagnation would occur. The only hope of effecting an improvement would be the introduction of something that raised the osmotic pressure in the plasma. Something of this sort happened in the use of calcium chloride as a diuretic and probably with ammonium chloride. He then referred to the work of Drury and Jones in demonstrating the effect of measured degrees of pressure upon the veins of the leg in producing œdema and also to Lewis's work on reactive hyperæmia and emphasized the importance of a rise in venous blood pressure as an initial factor. In regard to hydræmic plethora the retention of salt and water through kidney inefficiency was the initial cause of the œdema. If the so-called renal œdema were due to a spoiling of the endothelial wall, allowing undue permeability, there would be an initial concentration of hæmoglobin and not a dilution. Lewis had suggested tentatively that œdema other than that manifested as a wheal might be due to capillary-endothelial change and Evans had made the same suggestion. In addition to these three factors, rise in venous and capillary pressure, hydræmic plethora and altered permeability of the capillary wall, there might be further subtle factors which caused the persistence of œdema. In regard to treatment Sir Richard Stawell said that if any efficient flow could be established from the kidney, if a definite filtration gradient could be made by something like normal glomerular filtration, the other factors could be allowed to take care of themselves. He referred to operations which had been undertaken for decapsulation of the kidney. When this was done, the resulting improvement was due

to a decrease in extravascular pressure. When there was no demonstrable distension of the renal capsule, improvement had been only slight. The improvement had been the result of drainage of the kidney. Drainage of one kidney had determined the lessening and disappearance of œdema of the whole body. The question then arose as to what was the best diuretic in hydræmic nephritis. The best was that which was the most natural. The most natural were the water, ordinary salt solution and urea. In some cases of renal œdema the use of urea as a diuretic was remarkably successful. When it was not successful, it might be possible by some combination of diuretics to force a passage of fluid through the glomerular mechanism and thus to establish a normal gradient. He thought that it was possible, especially when the output of chloride in the urine was not negligible. He had had success when urea had been combined with large doses of ammonium chloride. In certain cases of cardiac œedma and ascites he had used "Novasurol" in combination with ammonium chloride with good temporary results. They did not know for certain how any diuretic acted, any more than they knew how the normal kidney acted. He purposely ended his address with a note of uncertainty because this would stimulate to alertness and further investigation.

Professor D. W. Carmalt Jones (Dunedin) dealt with the causation of œdema. Renal œdema was constantly present in parenchymatous nephritis and cardiac œdema might or might not be present in heart failure with dilatation. Renal œdema was due to defective filtration of the blood plasma through Bowman's capsule. In cardiac œdema the capillary endothelium failed in its function of preserving equilibrium between the blood and the tissue fluids and under the influence of gravity fluid passed out of the capillaries into the tissues in dependent parts. The brunt of heart failure might fall on different systems. Patients with heart failure might improve at first under treatment and break down at progressively shorter intervals. Gross œdema in these circumstances was of immediately grave prognosis. Cardiac œdema had been held to be due to oxygen defect. Fraser had shown that cardiac dyspnœa could occur with normal amounts of oxygen and carbon dioxide in the arterial blood and that the deficient oxygenation of the respiratory centre depended on a reduced blood flow per minute, the minute volume falling as much as 50%. In gross myocardial change accompanying œdema there might be actual diminution in the oxygen of the arterial blood. Wenckebach had studied beri beri and had found that heart failure occurred with dilatation of the right side, but without irregularities of the heart beat and that the œdema yielded at once to vitamin *B*, but not to digitalis or other drugs. The weakness of the heart in beri beri was due to retention of water by its fibres. Professor Carmalt Jones referred to other morbid states which appeared to be due to minor degrees of vitamin deprivation and asked whether the patient with cardiac œdema was one who suffered from deprivation of vitamin *B*. Did such deficiency determine the œdema in one patient when the better dieted patient with a similar lesion escaped? He asked for the experience of others in this regard.

Professor Hugh Maclean said that the subject was very difficult, but he had never heard a better discourse in so short a time. Sir Richard Stawell had said everything that it was possible to say about the subject. In œdema there were two fundamentals, the heart and the kidneys. The œdema of cardiac lesions was not so difficult to understand as the œdema of renal origin. There were stagnation of circulation and local changes. In the United States of America much work had been done in connexion with the renal condition. Some workers held that in the œdema of lipoid nephrosis extrarenal conditions were solely responsible, while others were coming back to the views Sir Richard Stawell had advanced with regard to the cause. Professor Maclean discussed the problem of the ability of tissues to absorb considerable amounts of water. Tissues also gave up water with considerable facility; he instanced the case of a wrestler who lost four and a half kilograms of water during a match. The administration of alkalis produced œdema in some patients and alkalosis in others. All his listeners must have had the experience of the treatment of diabetes with alkalis before the advent of "Insulin." Many of these patients must have developed alkalosis. He quoted the case of a well known golfer who was suffering from severe *diabetes mellitus* and was losing weight rapidly. On large doses of sodium bicarbonate and beef tea he gained six and a third kilograms in weight in fourteen days. There was the apparent paradox of a man who was losing weight whilst taking food, but gaining weight whilst not eating anything of nutritive value. When the kidney was unable to pass salt and water, the latter went into the intercellular tissue. The mechanism involved in the concentration of salt was primarily renal and secondarily intestinal. While the retention of sodium chloride by the intestines was of considerable importance, it was by no means easy to find an explanation for the resolution of hydræmic nephritis. Apparently something put the kidney into such a position that diuresis ensued. It was like pulling the trigger of a loaded gun. Professor Maclean quoted the case of a patient who had suffered from renal disease with considerable œdema which was very difficult to remove. The patient had been discharged from hospital and later had told Professor Maclean that he had cured himself by means of stout. Professor Maclean agreed with Sir Richard Stawell that urea was the best diuretic. Decapsulation apparently acted by promoting drainage.

Dr. J. F. Mackeddie (Melbourne) congratulated Sir Richard Stawell on the able way that he had attacked a most difficult subject. Sir Richard had left an indelible impression on his past students. He had learnt in his student days all he knew about œdema from Sir Richard and the additions to his knowledge had been gained from Professor Maclean. The clinical teacher had a great interest in the question of œdema and diuresis. He mentioned that one of the examiners in medicine in Melbourne had told them about a student who had been asked to name a diuretic; after a long pause he had said triumphantly, "Novasurol." The examiner thought that this was a very foolish reply, but recently he had had many patients treated with "Novasurol" in whom the results had been striking. As Professor Maclean had said, one had to consider the psychological moment when evaluating a diuretic. With regard to the methyl-purin group of diuretics there are many questions that students would ask, such as when to cease giving theobromine and when to start again. The use of such drugs as urea or "Novasurol" would have to be considered in the light of the urea content of the blood. Undoubtedly "Novasurol" had a baneful action at times. Christian, at the Peter Bent Brigham Hospital at Boston, had introduced a less noxious diuretic named "Salyrgan." Students were apt to be charmed by the words plasma balance and tissue œdema. Dr. Mackeddie held that albumin ratio was of importance in the production of renal œdema. The significance of plasma balance appeared to be exaggerated in the United States of America; in many articles kidney efficiency was not even mentioned. While discussing the question of the excretion of sodium chloride and protein and referring to the amphoteric reaction of protein, Dr. Mackeddie's time expired.

Dr. C. B. Blackburn (Sydney) congratulated Sir Richard Stawell, Professor Carmalt Jones and Professor Maclean upon their excellent addresses. Professor Carmalt Jones had stressed the gravity of œdema in heart conditions. This was not in accord with Dr. Blackburn's ideal. The question of the seriousness of œdema was apparently bound up with the state of renal efficiency. In patients of mature years with heart failure who suffered from œdema, the paramount question was whether or not the kidneys were in good order. Dr. Blackburn quoted the case of a girl of ten years whom he had attended in 1906 during an attack of rheumatic fever with heart failure and œdema. The œdema had disappeared under treatment; he had lost sight of the patient until 1927 when she was apparently well. He also mentioned the case of a woman whom he had treated in 1916 for auricular fibrillation with heart failure and œdema. This patient had improved with digitalis; she was crippled with arthritis, but was fairly well and able to lead a semi-invalid life. In this patient

the kidneys appeared to be functionally well. In regard to decapsulation of the kidneys he was unable to expect any good result, but at times interference with the kidney was sufficient to start the flow of urine. He spoke of a child on whom an operation for acute appendicitis had been performed. After three days the patient had not passed any urine. Œdema was commencing. About 1·8 cubic centimetres of urine had been drawn off containing a trace of albumin. The urea content of the blood was 240 milligrammes per hundred cubic centimetres and the creatinin eight milligrammes. He had persuaded Sir Alexander MacCormick to operate; he had cut down on the kidneys and had found some œdema of the capsule. After six hours the patient passed 0·85 litre (thirty ounces) of urine with very little albumin. Apparently the mere handling of the kidneys had been sufficient to promote diuresis.

In reply Sir Richard Stawell said that he did not consider the term hydræmic nephritis satisfactory. He had followed patients with œdema, ascites and hydrothorax whom small doses of urea had benefited and who had gradually improved after numerous tappings. The œdema had diminished and the amount of urine had increased. Later interstitial nephritis had gradually appeared, urea content of the blood had gradually risen and they had died within five to seven years of chronic interstitial nephritis or some of its complications, such as hemiplegia. Apparently in the early stages the kidneys had been unable to deal with the water and the chloride and in later years there had been a retention of nitrogen. He emphasized the unsatisfactory nature of consultation work with regard to following up the patients. He quite agreed that there appeared to be something analogous to the trigger action with diuretics. He had used "Novasurol" with ammonium chloride.

Protein Therapy.

Dr. Ivan Maxwell (Melbourne) read a paper in which he discussed the biochemical factors in protein therapy. He said that not all proteins would act as antigens. Some proteins, such as egg albumin, lost their antigenic properties when they were coagulated by heat. Others retained this property. He had been able to show that the boiled extract from rye grass pollen had but a slightly diminished antigenic power. Proteins in Nature were almost always in the colloidal state. Their complexity of structure was essential for antigenic action; amino acids formed by hydrolysis of proteins were not antigenic. He had found that dialysed and undialysed pollen extracts gave similar reactions, whereas the smaller molecules passing through the membrane and appearing in the dialysate, gave no reaction whatever. Corresponding proteins from different species could be readily distinguished by immunological methods. Immunological specificity was probably dependent on chemical specificity or on the pattern of the protein molecule. Coca had concluded that substance in ragweed, responsible for much hay fever in America, was non-protein in nature. Coca and Grove had digested a pollen extract with trypsin and removed the products of digestion by dialysis. The resulting solution had retained the power of producing reactions and yet by the Kjeldahl method no protein had been detected in the digested and dialysed pollen extract. Dr. Maxwell thought that the Kjeldahl method was gross compared with the delicate method demonstrated by Dale. It was improbable that trypsin would so completely digest the protein that its presence in solution would not be detected by the delicate immunological method. If this were true, protein was not excluded from being the antigenic factor in ragweed pollen. Dr. Maxwell then discussed his observations on the results of cutaneous tests in persons complaining of allergic symptoms, associated with hay fever, asthma and paroxysmal rhinorrhœa and showed that in Victoria at least pollen was of great importance in causing allergic symptoms. He also pointed out that neglect of hay fever was a most potent factor in the development of asthma and might also act as a precursor of nasal sinus infection. In regard to specific desensitization it was the medical attendant's duty to determine the chief cause of the symptoms and he was guided in this by the relative abundance of the grasses in the district and by the profuseness of their pollination. In conclusion Dr. Maxwell made a plea for a thorough treatment of pollen sensitization as a prophylactic against the development of certain forms of asthma and nasal sinus infection.

Professor D. W. Carmalt Jones (Dunedin) said that for seven or eight years he had practised vaccine therapy under Sir Almroth Wright; the principles he had inculcated were simple and still held good. The facts of antibody formation to any foreign albuminous substance as demonstrable against ricin, foreign blood and some bacteria were established; artificial immunity to typhoid fever by means of vaccines was known to be practicable. There seemed to be no reason why the same immunity should not be excitable in infected patients provided caution against overdosage was exercised. This was insured by the use of the opsonic index which revealed the phenomenon of the negative phase if the dose was too large. It had become the fashion to deride the negative phase. Things such as the occurrence of fatal retention of urine from prostatic obstruction following an overdose of gonococcal vaccine and the breakdown in tuberculous glands to aspirate their contents, had convinced Wright's school of its reality. The opsonic index established the minimal dose of Wright's school, in which therapeutic disasters were at least rare. A relatively small increase of dose had led to breakdown of infected tissues, whereas much larger doses were consistently given by other hands with impunity. Dr. Carmalt Jones believed that Wright's was the true specific therapy as against foreign protein therapy for which large doses were required. His own practice of vaccine therapy had been terminated by the war. As a therapeutic measure vaccine therapy had not justified itself. It would amount to malpractice to omit to give antitoxin in diphtheria, but few used tuberculin for pulmonary tuberculosis or vaccines for any of the known bacterial infections. Yet the formation of specific bacterial antibodies had been abundantly confirmed. In the production of efficient sera the greatest care was required, but it had been shown that bacteria contained many antigens, only some of which were of immunological importance and these might be lost in culture. All this contributed to the significance of the "rough" or "smooth" colonies and the *H* and *O* variations in culture. Many vaccines were no doubt inefficient on grounds of this kind. Vaccine therapy in expert hands was still a valuable method of treatment, but it was far from fool-proof. He had had a personal expression of opinion from a man who had been a quarter of a century with Wright, that it had been valuable in boils, in acute respiratory infections, in surgical tuberculosis, in some forms of asthma and in coli infection. But that did not mean that a practitioner could buy a vaccine from the manufacturers as he bought "Insulin" and use it successfully by rule of thumb. He gave a few of the reasons why the curative use of vaccine might be successful. The laboratory workers had found that antibodies were of one kind only, one antigen produced one antibody only; precipitins, lysins, agglutinins and opsonins had no separate existence, but represented the immune response proper to particular methods of contact between antigens and antibody. When a person was inoculated with a vaccine, for example tuberculin, his opsonic index to tubercle bacilli rose. The reality of the index had been brought home to him when the third laboratory worker whose blood had been found not to be dependable as a control, succumbed with clinical tuberculosis and it was confirmed when another man with an unexplained toxæmia was tested against the glanders with which he had been working; the opsonic index was high and the man died of glanders. In regard to the efficacy of the small dose Dr. Carmalt Jones said that he had been converted to vaccine therapy by his first experience at Saint Mary's Hospital. A man whose neck was a mass of ulceration after the unsuccessful removal of tuberculous glands, had recovered completely and was employed in the laboratory as the "awful example." Later, in New Zealand a girl had been operated on for supposed appendicitis; tuberculous glands had been found and a sinus had been established which had existed for several years. This healed under tuberculin in about six weeks, but broke down again several times at increasing intervals. In about six months it had healed completely and had

remained healed for about five years. A young man had extensive genito-urinary tuberculosis and frequency of micturition. In about six weeks his micturition had been reduced from thirty-six times to eighteen times a day. The dose was about 0·00005 milligramme of bacillary emulsion. Once the dose had been inadvertently doubled; his frequency of micturition had been doubled likewise. If they could always obtain this kind of result there would be no question of the efficiency of vaccine therapy; unfortunately they could not. The failures which were so numerous as to have discredited the method, might be due to the fact that bacteria contained many antigens, only some of which were immunologically efficient. It was easy to get the wrong one into the vaccine; there was further the difficulty of determining the offending organisms. An infected patient might be quite incapable of responding to a vaccine or might require a particular dose to enable him to do so, neither of which could be determined at present *in vitro*. In practice some patients could be made to respond and some could not. He ventured the opinion that vaccine therapy by the minimal dose in specific therapy was frequently a valuable method. It required for its successful use all the judgement that any other branch of the healing art required. Many people regarded the negative phase as a bogy and pressed their doses far beyond anything they needed. Immunologists appeared to hold the opinion that this was simply protein therapy with nothing specified about it. Many instances were recorded of improvement of other diseases under such treatment. Cleland had recorded instances of the improvement of gonococcal arthritis in patients treated with prophylactic influenza vaccines. This was, of course, but one phase of a very familiar phenomenon manifested as the occasional recovery from a chronic disease on the incidence of an acute one. Chronic dysentery cured by pneumonia was a familiar instance; the old practice of inducing erysipelas to cure conjunctivitis, the treatment of general paralysis of the insane with malaria or rat bite fever were others. In all these conditions the dose used was a large one. Dale had pointed out that anaphylactic signs occurred frequently after large doses of antidysentery serum, while they were rare after small doses of prophylactic antitetanus serum. Compared with Wright's curative doses those of prophylactic vaccines were colossal. He could not explain the biological factor underlying the large doses of vaccines for curative purposes as protein therapy. Some observers attributed the success of the method to the heat engendered by the febrile reaction induced. The simplest conception of immunity was that of Dale, who suggested that all species of animals depended for their native qualities on their specific protein pattern and that they resented the introduction of any foreign protein by the formation of antibodies which might be discharged into the blood stream or might be retained in the cells, in which case the phenomena of anaphylaxis were liable to occur on the reintroduction of the antigen. Asthma, gastro-enteritis and urticaria were held to be anaphylactic phenomena.

DR. A. E. TAYLOR (Dandenong) had nothing to say with regard to protein therapy. He had read a paper on vaccine therapy before the Victorian Branch of the British Medical Association; he had practised for thirty years and had found vaccine therapy useless. He stated that it never did any good and usually did some harm. If the practitioner undertaking the therapy used small doses of vaccine, the patient was fortunate. The use of vaccine was opposed to common sense and to theory, but that was nothing if practical experience showed the method to be useful. He had also studied the literature on the subject and was satisfied that when it was reported that the use of vaccine was followed by benefit, there had been a mistake in observation.

DR. B. M. SUTHERLAND (Melbourne) thanked Dr. Maxwell for his paper and Professor Carmalt Jones for his part in the discussion. He stated that the question of biochemical factors in allergic conditions was interesting and he felt that advance would have to be along academic lines. Dr. Sutherland was convinced that the phenomena of hypersensitiveness were the important factor in diagnosis and also in treatment. Referring to Dr. Maxwell's remarks with regard to failures to elicit reactions to pollens, Dr. Sutherland said that some patients had difficulty in elaborating antibodies to the various pollens. Occasionally poor results in testing were due to poor reagents. For example, in a series of five hundred patients Hurst had found only 6% or 7% to be sensitive; in Dr. Maxwell's series more than 50% were sensitive. One point of interest was that hay fever frequently preceded asthma, but when the asthma came the hay fever disappeared. The greatest bugbear in regard to the treatment by specific methods was the risk of constitutional reaction. There was also a risk of prolonging the treatment to such a period that the patient lost patience. With too rapid an increase from the dosage there was always a risk of serious upset. Normally each succeeding dose should be double the previous one, but it was necessary that when the injection caused local reaction to increase by only a quarter or a half of the previous dose. Dr. Sutherland expressed the opinion that if they could find some method of reducing the reaction, it would be a most important advance. With regard to patients treated by non-specific protein therapy their symptoms were frequently due to specific factors, for example patients with hay fever occurring in the spring (in Melbourne between October and January) or patients with rhinorrhœa. In these patients vaccine therapy apparently lessened sensitiveness. Dr. Sutherland went on to state that in November it was too late to begin specific therapy. A mixed influenzal vaccine reduced sensitiveness. The same applied to patients sensitive to horse dander. Vaccine therapy frequently produced good results, although better results were produced by specific therapy. One important point was that the results were better after a local reaction when the arm was red and swollen and the patient had general symptoms, such as headache. Referring to the negative phase Dr. Sutherland said that this was a reality. He did not wish to discuss it from the theoretical side; sometimes in patients with asthma, when he had increased the dose too rapidly, bronchitis appeared and rendered the patient miserable.

DR. SINCLAIR GILLIES (Sydney) asked Dr. Maxwell what was the time intervening between the injection of the antigen and the appearance of the manifestations of sensitization. Dr. Maxwell replied that the serum of a patient sensitive to a mould had been injected into an individual. Some days later the antigen had been injected into the site of the previous injection and also as a control into the upper arm. There had been no reaction at the control site, but a reaction had appeared at the other site, indicating local sensitiveness. Dr. Sinclair Gillies thanked Dr. Maxwell. He stated that in the early days he had experience of the Calmette reaction with tuberculin. In this method a drop of tuberculin was placed in the patient's eye. There was no reaction in the normal eye, but if a further drop was placed in the eye from three to twelve days after the first drop, there was a definite reaction. The question of how long sensitization lasted was important. In some cases it was found that this sensitization lasted from two to six months or even a year. The length of time of sensitization had some bearing on desensitization. The question of desensitization was very important in the treatment of patients with tuberculin. While an attempt was made to regulate specific doses, the patient received unknown doses from his disease. For that reason tuberculin had been practically given up in pulmonary tuberculosis. In local lesions good results were obtained. Dr. Sinclair Gillies said that he would like to ask Dr. Maxwell whether the results of treatment were better if the injections were made before the pollen season began. He would also like to know the percentage of favourable results and he wished to draw attention to the psychic factor in the treatment of these patients. He recalled the time when cautery of the septum was in vogue as a method of treatment of asthma. It was decided at the Royal Prince Alfred Hospital to test this method and twenty patients were selected. They were first given medicine, burnt sugar and water. The results were so good that there was no necessity to cauterize the septum.

DR. C. T. CH. DE CRESPIGNY (Adelaide) spoke of a patient, a girl, aged seventeen, who was sensitive to egg albumin and suffered from urticaria from eating eggs. If she abstained from taking egg, she was quite free from symptoms, but one day she had inadvertently eaten some ice

cream thickened with egg white and had nearly died as a consequence. She was so sensitive to egg albumin that if she went into the kitchen where they were beating up eggs, she would be seized with an asthmatical spasm and urticaria would appear. Dr. de Crespigny had immunized her with egg albumin and she was able to eat eggs again, but if she was without eggs for ten days she again became sensitive. He had found it necessary to give at least one egg in two days to prevent the recurrence of the untoward symptoms. Apparently the desensitization only lasted for a short time.

Dr. D'Arcy Cowan (Adelaide) stated that he had very little experience in this matter, but there were a few important points that he would like to mention. He had seen patients with hay fever treated by the rhinologist for two or three years and then the particular pollen to which they were sensitive, had been discovered and after injection they had experienced immediate relief and had remained well. Undoubtedly the patients received benefit. Dr. Cowan said that he would continue to use the method in selected cases. With regard to tuberculin, some patients undoubtedly derived benefit. In the presence of fever it did harm, because they could not control the autoinoculation from the disease, but in patients with mild chronic infections in whom autoinoculation was almost balanced by the production of antibodies, good results were obtained. It appeared to him to be rational therapy in these circumstances. There were two ways of giving tuberculin, the large and the small dose. Dr. Cowan did not believe that the small dose method was right. He had not seen small doses do any good in pulmonary tuberculosis, but he had seen Sir Robert Phillip use the method with good results in Edinburgh for surgical tuberculosis. In regard to large doses the question arose as to how it acted. He had treated patients suffering from tuberculosis for about four years, who had been treated by conservative methods without improvement. He had then given them tuberculin over a period of six or twelve months and they had become well and had gained fourteen to twenty kilograms in weight and remained well. He had no doubt that they had received considerable benefit from the injections. He had had seventeen years of experience of tuberculin and had not seen any bad results. The danger was in too great a focal reaction; in that case the lesion might be broken down and the tuberculous process disseminated. Discretion had to be used in adopting this method, but some quite appalling things were done by some doctors. Dr. Cowan related that a firm had obtained from him some of his original tuberculin. Some days later a doctor had communicated with him and asked what it was he had given to the firm. He then discovered that the doctor had injected the tuberculin undiluted. He asked how much and the doctor had said a few drops, but had been unable to tell, as a leaking syringe had been used. The doctor wondered why the patient had nearly died. Tuberculin should not be used for patients with recent hæmoptysis or recent hæmaturia. He gave an account of the history of a patient who had been operated on and had been found to be suffering from tuberculosis of the glands in the ilio-caecal region. He had been consulted by this patient and had thought that he was suitable for the injection of tuberculin. Three months later he had been called in to see the patient and had found him dying from miliary tuberculosis. On investigating the matter he found that after the injection it was stated his temperature rose to 37·9° C. (102° F.), but it was normal in the morning. He thought that this was peculiar; a reaction from tuberculin did not appear until the following day. On further inquiry he had discovered that the man's temperature had risen to about 38° C. every day. He was receiving an autoinoculation of tuberculin and should not have been given injections of tuberculin.

Dr. Konrad Hiller (Melbourne) said that he thought that vaccines were of some use. The greatest use was in prophylaxis, but he also used them for curative purposes. He agreed with Professor Carmalt Jones about the negative phase. He quoted instances of patients with frequent colds deriving benefit from vaccine. The procedure was valuable, provided there was no inflammatory condition in the accessory sinuses, but even in those circumstances, it was of some benefit and might do more good than a mutilating operation on the nose. With regard to the negative phase, in the course of a series of prophylactic injections for colds, he had often noticed after the first injection that the patient felt the symptoms of a cold, but the next day he was better. He did not have the symptoms after the second or third injections. Dr. Hiller had never had any bad results and provided the doses were not too large and acute inflammation was not present, there was no danger in the method. The method should be tried. A septic antrum, of course, needed surgical treatment. The question of anaphylaxis was interesting and the reason why a patient died during an acute attack was difficult to explain.

Dr. Maxwell in reply confined himself to the specific protein problem, for example, in hay fever. Dr. Maxwell argued that the protein was responsible for the symptoms in hay fever. He preferred to deal with one factor at a time. In the case of pollen one was able to determine the sensitiveness by the skin test. The same result could not be obtained from the use of a vaccine. They could not always be sure of the causation of the various conditions in which vaccines were used. He had carried out observations of over six hundred persons and he had come to the conclusion that there was something specific in the reactions of pain. Desensitization was a sound procedure. Replying to Dr. Sutherland, with reference to poor results, Dr. Maxwell stated that he used the pollen powders instead of the solutions which did not keep in Australia. In his experience it was the only satisfactory method to use. He got 700 positive results out of 1,000. It was very difficult to predict whether a patient was likely to have a constitutional reaction after an injection. Freeman who had more experience of this method than anyone else in England, had given a patient an injection and the patient had collapsed and suffered from severe constitutional reaction. In reply to Dr. Sinclair Gillies concerning the passive transfer of hypersensitiveness from the normal person fed on egg albumin, he had seen a severe local reaction in forty-five or fifty persons. Apparently the protein molecule was able to pass through the intestinal mucous membrane in some unknown way. The ideal time to perform an injection was before the pollen season began and it was his custom to instruct the patient to report two months before that time. The desensitization was performed the same way as on the guinea-pig. If the patient came to him during the pollen season, it was difficult to help him. With regard to the psychic factor, Dr. Maxwell thought that this could be eliminated by the large number of patients treated by him. Furthermore, it would be difficult to explain the case of the patient who was sensitive to cape weed pollen and had collapsed from anaphylaxis caused by an overdose. In reply to Dr. de Crespigny with regard to the egg albumin, he said that the development of hypersensibility occurred in the interval between the first and second injections. The explanation was probably that after two or three days antibodies appeared in the blood stream. At the end of ten to fourteen days the antibodies were fixed in the tissue cells, hence the return of the sensitiveness. Dr. Maxwell quoted the case of a patient who was sensitive to the New Zealand blue cod. After eating this fish the patient suffered from intense œdema. Skin test on the day the œdema was present, failed to elicit a reaction. Fourteen days later a test was performed and it produced the most intense reaction that Dr. Maxwell had seen. The erythema appeared from the wrist to the elbow and there was a very large urticarial wheal at the site of the injection.

Paroxysmal Tachycardia.

Dr. M. D. Silberberg (Melbourne) read a paper on paroxysmal tachycardia. He said that the condition was often preceded by isolated extra systoles or premature contractions. This gave the key to the condition which was in reality made up of a rapid serial succession of extra systoles. It was highly likely that increased excitability of the heart muscle was the basis for the attacks. This in turn might be brought about by toxic, inflammatory or degenerative pathological changes or merely by heightened functional excitability through sympathetic innervation. Paroxysmal tachycardia comprised all forms of tachycardia with an abrupt onset and offset and there-

fore included paroxysmal auricular flutter and paroxysmal fibrillation as well as simple paroxysmal tachycardia. Dr. Silberberg based his remarks on 104 cases met with in private practice, 76 of simple paroxysmal tachycardia and 28 of paroxysmal fibrillation. He described the symptomatology and illustrated his remarks by reference to different patients. He said that in paroxysmal tachycardia a large proportion of patients manifested no demonstrable lesions or direct causative agents. In his series this proportion was 14%. The effects of influenza were important and associated chronic catarrhal conditions of the antra and sinuses played a part. Other factors were dental infections, excess in the use of tobacco, especially excessive cigarette smoking and over-indulgence in alcohol. The effects of arteriosclerosis and obesity had to be reckoned with and strain might initiate attacks which sometimes became recurrent. In discussing the various types of therapy, Dr. Silberberg said that quinidine was the most dependable of all drugs. Unfortunately it was neither infallible nor harmless. Its chief virtue was in prolonging the refractory period in the auricle; this meant that the advancing wave might be blocked, the attack terminated and the normal rhythm restored.

Dr. O. A. Diethelm (Sydney) said that he was very much indebted to Dr. Silberberg for his lucid explanation of a difficult subject. He wished to quote a case of interest which demonstrated the close relationship between paroxysmal tachycardia and foci of infection. The patient, fifty years of age, had been admitted under the care of Dr. J. L. McKelvey suffering from acute inflammation of the gall bladder. The pulse rate had been very rapid; this was due to paroxysmal tachycardia. He had had attacks at varying intervals for two years; this attack had lasted for seven days. After the third day the condition had improved with treatment by digitalis, morphine and sedatives. The attack had ceased on the seventh day. He had been kept under observation for four weeks and it had been arranged to submit the patient to operation. Three days before operation a fresh attack had occurred. The patient had again been observed and treated and had then been submitted to operation. On the tenth day after operation the patient had had another attack which had lasted for twelve hours. No further attack had occurred for three years. Dr. Diethelm regarded this as a striking case illustrating the relationship between foci of infection and paroxysmal tachycardia. With regard to the checking of the pulse rate during the attack, his own results were disappointing; no relief could be ascribed to drugs such as quinidine, digitalis and sedatives. Unfortunately, he had been forced to the idea that drugs were quite useless.

Dr. N. W. Markwell (Brisbane) was glad to hear Dr. Silberberg stress the point that there was no need for worry about a fatal issue during the attack; the occurrence of the rapid pulse rate was analogous to hæmoptysis in tuberculosis. Treatment with quinidine was useful, provided that the heart muscle was compensated. He had given large doses at long intervals and had had no cause to worry. But he had not had any patients who required as much as four grammes per day. He referred to a case reported by Levine and Curtiss, of a patient suffering from auricular fibrillation and paroxysmal ventricular tachycardia. The heart muscle was giving out. The patient was suffering from anginal pain. Digitalis had no effect; a test dose of quinidine was given and a dose was then increased by 0·1 gramme three times a day up to 0·6 gramme three times a day. The double beats stopped. Quinidine was then continued in doses of 0·8 gramme (twelve grains) three times a day for twelve weeks at the time of publication. The prognosis depended upon the frequency of the attacks. The state of the myocardium was most important. Dr. Maxwell stated that he was a firm believer in electrocardiograms. But he held some views that were perhaps not accepted by everybody. He found that patients with a normal *Q-R-S* complex and a normal *T* wave did well on digitaline. With regard to the slowing of rate, this usually occurred on the last day before normal rhythm was restored.

Dr. Joseph Coen (Sydney) said that a striking fact about cardiac arrythmias was that they were not dangerous. The reason was that they were associated with very small gross changes. The condition of the myocardium was most important, while mere disturbance of rhythm did not matter so much. He illustrated this point by referring to a patient with auricular fibrillation with a rate of eighty to ninety per minute. Provided the circulation was efficient, no disturbance need be expected. He had not found any drug of value and considered that it was often inadvisable to try to change the rhythm. Quinidine might be dangerous. The nervous element played a part in the ætiology of paroxysmal tachycardia. Stress was important. It was different from flutter and fibrillation. The mechanism of the production of tachycardia and auricular fibrillation was different. Quinidine interrupted the circus movement in auricular fibrillation. In paroxysmal tachycardia the impulse arose from some part of the heart muscle other than the sino-auricular node. Dr. Coen had never been able to convince himself of the value of quinidine in this condition. With regard to dosage of quinidine he agreed with Dr. Silberberg that large doses were well tolerated; one patient had been given over five grammes in twenty-four hours. Quinidine had to be carefully used. In Dr. Coen's opinion it was contra-indicated if the blood pressure was elevated, the pulse very rapid and decompensation present. Dr. Coen stated that he had been with a man who had a very large experience of quinidine in the United States of America, but he told Dr. Coen that he regarded quinidine as he would regard a major operation in surgery; judged by the great care and attention he paid to his patients in the administration of quinidine, he lived up to his principles. As far as the ætiology was concerned he again emphasized the nervous element and suggested that a possible extracardiac cause should always be borne in mind.

Dr. R. F. Llewllyn (Sydney) stated that shortly after entering into practice about twenty-five years previously, he had treated a woman suffering from paroxysmal tachycardia. In those days there were some vague ideas about the pathology of heart disease. He had noticed that there was excessive rise in blood pressure. He had given her 0·12 mil of trinitrin; the attack had stopped in a few minutes. Since then he had used trinitrin and it had failed on many occasions. He suggested that the fall of blood pressure might have some effect on the capillary circulation of the heart wall.

Dr. S. V. Sewell (Melbourne) said that he was alarmed when a patient suffered day after day from a rapid heart action. One patient under the care of the late George Adlington Syme had a pulse rate of 180 for two days; the rate then came back to normal. The patient had given a history of similar attacks lasting twenty-four hours or less. Polygraphic tracings had been found to be typical of paroxysmal tachycardia. At the end of three days the pulse had become normal and Dr. Sewell could see no reason why operation could not be performed, but he decided to wait a week in order to rest the patient. Immediately after the anæsthetic the pulse rate had increased to two hundred and had remained at that rate for seven days, when death ensued. Nothing was of any avail. He related another similar experience. Prolonged attacks were more serious than brief attacks. The history of another patient illustrated the slight importance of auricular fibrillation in chronic affections. This patient had been admitted as an in-patient nine times in a water-logged condition. The thorax had been tapped. Dr. Sewell had returned from England in 1911 imbued with the idea of larger doses of digitalis. The patient had made an excellent recovery. She was at that time receiving an invalid pension. He gave her a maintenance daily dose of digitalis. She secured the position of a working housekeeper. She had not been dropsical since. She had been attacked by influenza during the epidemic in 1919 and had suffered from pneumonia and had been treated in an emergency hospital. She was quite well, but never went without her daily dose of digitalis. The case was of great interest, as it was the longest he had had under observation. He asked Dr. Silberberg what should be done for attacks of paroxysmal tachycardia which persisted for days, when operative interference was necessary. He also asked how a patient should be prepared for operation.

Professor D. W. Carmalt Jones (Dunedin) said that only cardiologists could be expected to discuss such a paper. He asked Dr. Silberberg what was the prognostic importance of paroxysmal tachycardia. He could recall one or two cases. The first was in a woman admitted with paroxysmal tachycardia who went out and returned later with hemiplegia. She suffered from mitral stenosis and was what one might term a cardiac cripple. She also had diabetes. She died during one of the attacks. He asked if the outcome could have been foretold. The second was in a woman with pneumonia who had suffered from an attack of paroxysmal tachycardia of seven hours' duration. She had been discharged from hospital, had later become pregnant and had been delivered twelve months previously. She had died with a high pulse rate. He raised the question of the significance of the paroxysmal tachycardia in this patient. A cadet from Dartmouth had slipped down and had collapsed while exercising. It was said that his heart was diseased. Later he had become a midshipman in the Navy and had suffered from appendicitis. He had been able to run about quite well and in the original attack had been laid up for two or three days. Could a diagnosis of paroxysmal tachycardia be made on the history? He would like to know what the prognosis was of these conditions. Another important point was that the auricular fibrillation was not always permanent. He spoke of a middle-aged woman with auricular fibrillation. She had been put to bed and the irregularities had ceased for a year. Was this a case of auricular fibrillation or were extra systoles present? Professor Carmalt Jones then quoted a case of heart block with Stokes-Adams fit. The patient had stopped breathing and the heart had stopped beating. The sister of the ward had called him and he had given an injection into the heart and then the pulse was again felt and the heart continued to beat faster than it had done for some years. Professor Carmalt Jones wished to know whether there was any means by which the heart in heart block could be stimulated to rapid action.

Dr. Silberberg said that gall bladder disease was a potent source of toxic absorption. Whether the effect was reflex or by direct absorption he was unable to say. The doses of quinidine should be pushed if necessary. He wished to repeat the warning as to the toxicity which had been uttered by Dr. Coen. He did not agree that high blood pressure was a contraindication, but he considered that advanced degeneration of the heart muscle was a definite contraindication. The ideal patients for quinidine were those without gross pathological changes. Embolism was the chief bugbear. He recommended the dose of 0·18 gramme every hour to begin with, increased to 0·38 or 0·5 gramme until a result was obtained. Some writers had mentioned the intravenous injection of quinine. He had had no experience of this. Intravenous injection of quinidine was also being used, but Dr. Silberberg said that he would not care to use it. More experimental work was necessary before the method was justifiable. With regard to trinitrin he had had no experience in paroxysmal tachycardia, but he would be chary of its use because it was followed by a fall in blood pressure and by unconsciousness. With regard to the poser put by Dr. Sewell, he said that he would use large doses of digitalis or intravenous injection of strophanthin or quinidine after he had allowed the effect of the digitalis to pass off. If the attack did not pass off and the operation was imperative, he would recommend the use either of a local anæsthetic or of gas and oxygen anæsthesia or ethylene anæsthesia. He had attended the discussion in the Section of Anæsthetics on cardiac disease in relation to anæsthesia. Dr. Lidwill had spoken of many patients with severe heart disease whom he had anæsthetized with nitrous oxide and ether. It was apparently a matter for the anæsthetist. Dr. Sewell then interposed that the patient had had several prolonged attacks and he would like to ask whether he was justified in giving an anæsthetic when the pulse was normal and what treatment should be adopted. Dr. Silberberg suggested that quinidine should be used three times daily. He thanked Professor Carmalt Jones for his interesting series of cases and in answer to the question whether they could always tell from the history if the condition was paroxysmal tachycardia or not, Dr. Silberberg stated that the history of onset was most important. He always asked patients to explain what they meant by palpitation. With regard to the case of heart block and extra systoles, he had seen patients restored and the heart commence to beat again. Ephedrine was used in frequently recurring Stokes-Adams disease and the attack stopped. The introduction of the portable electrocardiograph had proved of great value. It could be used in the infectious diseases hospital, in general hospitals where patients were dying, to note the state of the musculature, or it could be used in the infirmaries where old people were congregated. Its use by an energetic cardiologist would produce much valuable information.

Cardiac Arrhythmias.

Dr. Alfred Webster (Perth) read a paper on cardiac arrhythmias.

Dr. S. V. Sewell (Melbourne) said that he did not apologize for his remarks in 1913 about the heart fibrillating. He felt he was in good company with regard to the use of the term fibrillation. He protested against the way Dr. Webster had attacked Mackenzie's patient observations. Dr. Sewell had first undertaken the observation of the pulse when a young graduate and he felt that he had received more stimulation from Sir James Mackenzie's book than from any other work. Mackenzie had carried out his observation while in general practice and while doing a very large amount of work. He was sitting up at night taking and examining pulse traces. Prior to the advent of Mackenzie's work in the old text book the irregularity of the heart was classified into irregular and regular forms and it was considered that the regular variety was more dangerous than the irregular. James Mackenzie had evolved a practical hypothesis which had made the work of Sir Thomas Lewis and he might say the work of the reader of this paper possible. Mackenzie distinguished between *pulsus alternans* and *pulsus bigeminis*. The patient was altogether in a different position with *pulsus alternans* and with *pulsus bigeminis*. Dr. Sewell had seen only very few patients recover from *pulsus alternans*. The condition was usually due to temporary exhaustion of the myocardium following pneumonia. The beats were regular in time and but irregular in force. If not associated with acute disease *pulsus alternans* was always of grave significance. *Pulsus bigeminis* was not of importance, being merely a series of extra systoles. The electrocardiograph showed that at times the heart conditions with extra systoles were of serious significance. There were numerous ectopic points producing multiple irregularities. Should these points be situated in the auricle, auricular fibrillation might arise; if in the ventricle, ventricular fibrillation. Dr. Webster had done much useful and painstaking work, but Dr. Sewell thought that he was extremely unfair to the giants whom he preferred to worship.

Dr. M. D. Silberberg (Melbourne) said that he took his courage in both hands in entering into the discussion. He envied Dr. Webster his flow of language. He thanked him for his extremely interesting quotations. With regard to the interpretation of the tracings there was just one point that he would like to mention. He failed to understand Dr. Webster's difficulty in connexion with the graphs of the fibrillation which appeared to vary. He showed diagrammatically that this depended upon the number, position and origin of stimuli that had passed down the conducting bundles. He would like to correlate Dr. Webster's results with the cardiographic tracings or with the records of the portable electrocardiograph. He bowed to Dr. Webster's long experience, but he felt that he, Dr. Silberberg, was unable to interpret the tracings with just a glance at them. In conclusion he said that he was afraid that he was unable to scrap physiology in favour of the various philosophical points brought forward.

In reply Dr. Webster stated that he would not enter into competition with electrocardiographers. He had abandoned Mackenzie's theories. Dr. Sewell was not his biographer. He read a letter written by the late James Mackenzie at Burnley in 1902 to himself in which Mackenzie had stated that he regarded the case reported by Dr. Webster as a classic.

Chronic Pulmonary Infections.

The Section of Medicine together with the Section of Oto-Rhino-Laryngology, the Section of Pædiatrics and the Section of Radiology and Medical Electricity were in combined session for the purpose of discussing the subject of chronic pulmonary infections in relation to the upper respiratory tract.

Dr. R. Graham Brown (Brisbane) read a paper in which he discussed chronic pulmonary infections in relation to the upper portion of the respiratory tract. He said that bronchiectasis was often associated with nasal sinus suppuration and he emphasized the importance of early diagnosis. Bronchiectasis might develope as a secondary condition to sinus suppuration in three ways. In the first place the sinus infection might predispose to repeated colds in the head and to a repeated direct extension of the inflammation to the lower part of the respiratory tract. In the second place bronchiectasis might develope as a result of an actual infection through aspiration of the pus into the bronchi and its retention there during sleep. In the third place infections from a septic condition about the nose might be borne by the blood stream to the lungs. He divided bronchiectasis into two classes. The first comprised those forms associated with and probably dependent upon antral or more rarely other accessory sinus suppuration or suppurative conditions of the naso-pharynx. The second included those not so associated. This class was subdivided into a group comprising those associated with a foreign body retained over a long period in the bronchial tree and a group of those due to other causes such as influenza, pneumonia. After referring to the symptomatology of bronchiectasis, Dr. Graham Brown referred to the necessity for careful X ray examination. In regard to treatment it was important to correct any nasal obstruction. It was futile to treat the bronchiectasis without checking the sinus suppuration. The use of the bronchoscope as a means of drainage and lavage did no harm, but it did not produce the results which had been promised for it a few years previously. If iodized oil was injected into the bronchial tree, a general anæsthetic should be used and the practitioner should be present at the screening. The injection of oil from a syringe, as advocated by Singer, was a simple procedure. In conclusion Dr. Graham Brown referred to the association of pulmonary tuberculosis with sinus suppuration. The latter often simulated the former. Pulmonary tuberculosis could be aggravated by the presence of pus in the nose and naso-pharynx. Care should be exercised in choosing tuberculous patients for operation. Often it was necessary to be content to keep the nose and naso-pharynx clean.

Dr. J. F. Mackeddie (Melbourne) read a paper in which he discussed the diagnosis and treatment of chronic lung conditions in their relationship to disorders of the upper air passages. The question of diagnosis was summed up in that of sinus or antrum derangement. The signs and symptoms of a non-tuberculous bronchiectatic cavity were well known, but in spite of warnings in the literature the onset of hæmoptysis in a patient so affected might result in his being sent to a sanatorium for sufferers from tuberculosis. Dr. Mackeddie referred at considerable length to the use of X rays in diagnosis and said that at the Alfred Hospital they used the crico-thyreoid puncture method with a local anæsthetic. The best method for children was that used by Dr. Middleton, of the Children's Hospital, Carlton. He employed a general anæsthetic with transglottal introduction of a metal-tipped catheter to carry the "Lipiodol" to any desired area. The supraglottal method without an anæsthetic, introduced by Singer, of St. Louis, was likely to take the place of all other methods. Dr. Mackeddie then referred to the difficulty of the interpretation of the picture of the injected bronchi and to the use of the bronchoscope in diagnosis. In regard to treatment the first question of importance was that of prophylaxis and this involved consideration of infection of the sinuses and the naso-pharynx. In the second place, it was always necessary to exclude the presence of a foreign body. The advocates of "Lipiodol" claimed that it had therapeutic properties. It had been shown that the "Lipiodol" remanet was removed by phagocytosis and it was thus possible that the induction of a local leucocytosis might be beneficial. When bronchiectasis was well established, treatment consisted in the provision of drainage with the added possibility of repair. It had been determined by Burrell that artificial pneumothorax was useless without phrenicotomy and that the duration of compression for bronchiectasis was as a rule three times that required for tuberculosis of the lungs. Dr. Mackeddie referred to six patients who had suffered from abscess of the lung. In three the abscess had ruptured into the pleural cavity. It was important that a patient whose lung had been compressed on account of an abscess, should not be allowed to walk about for a considerable time. In conclusion, Dr. Mackeddie laid stress on the importance of cooperation between physician, laryngologist and surgeon.

Dr. E. Britten Jones (Adelaide) thought that bronchiectasis was a much commoner disease in children than was usually supposed. It was his experience that the physical signs were very indefinite and that the diagnosis was as a rule suggested by the history. He laid stress on the value of the Mantoux intradermal test in the presence of persistent cough in children and he thought that the value of the vague physical signs was considerably enhanced by failure to obtain a reaction to tuberculin. In treatment they had endeavoured to eradicate foci of infection in the antra and to improve the general health of the child. The treatment of the lung condition had been limited to the adoption of suitable posture and breathing exercises. He gave details of eight children varying in age from six to fourteen years. In one instance no sinus infection had been sought, but in all the other children infection of the antrum had been present.

Dr. K. Stuart Cross (Melbourne) discussed the radiological appearances in chronic pulmonary infections. He dealt with a series of one hundred patients. He had found it possible to classify seventy-one of these and had divided them into two categories, those suffering from pulmonary tuberculosis and those suffering from non-tuberculous infections of the lung. Of twenty-six persons with chronic tuberculous disease nineteen had presented normal sinuses, in four the condition of the sinuses had been doubtful or slightly abnormal and in three a gross abnormality had been discovered. Of forty-five persons with chronic non-tuberculous conditions only one had had normal sinuses, in seven the sinuses had been doubtful or slightly affected, in five the abnormality had been moderate and in thirty-two the abnormality had been gross. Dr. Cross described in detail the condition of the three tuberculous patients whose abnormalities were gross, and showed that in two of them it was doubtful whether the classification was correct. He concluded that a determination of the condition of the sinuses was an important point in the differential diagnosis of chronic tuberculous and non-tuberculous infections of the lung. He thought that an examination of the paranasal sinuses should be made in every chronic lung condition.

The Use of "Lipiodol" in Bronchiectasis.

Dr. J. Stanley Verco (Adelaide) described the method of examination of children by the injection of "Lipiodol" into the trachea. He said that he always used general anæsthesia and chose the crico-thyreoid route. It was necessary to be sure that the patient had no idiosyncrasy to iodine. Dr. Verco also made passing reference to the other methods of introducing "Lipiodol." He showed a series of skiagrams to illustrate his remarks.

Sir Richard Stawell (Melbourne) said that the matter of relationship of infections of the upper respiratory tract with the lower respiratory tract had interested him for four or five years. Everybody knew that nasal infection was frequently associated with tracheitis and later inflammation of the more distant parts of the lower respiratory tract. It had not been realized until a short time previously that latent infections of the upper respiratory tract were associated with serious lesions of the lower respiratory tract. Sir Richard Stawell referred to the patient mentioned by Dr. Cross. He also related some facts about a patient of his from Jerilderie whose husband had died from pulmonary tuberculosis. A right-sided pleurisy had appeared and persisted. This had occurred about twenty years previously when X ray examination was in its infancy. It had been noticed on screen examination that

there was limitation of movement of the right side of the diaphragm. This they thought was due to the existence of a right-sided pleurisy. The patient for a time had improved. There had been occasional returns of the pleurisy. Recently the patient had returned from England and had again suffered from pleurisy. Sir Richard felt uneasy with regard to the right side. There was pleurisy but no apical involvement. This made him doubt the diagnosis of tuberculosis. He had sent the patient to Dr. Cross for X ray examination. Dr. Cross had wisely ignored his request to examine only the chest; he had examined the sinuses by the chin-nose method. He had found that there was double suppurative inflammation of the antrum with polypoid growth. This had been removed and the patient had improved after twenty-five years of bronchiolitis and pleurisy. From this emerged the fact that chronic bronchial infections could exist without patent inflammation of the upper respiratory tract. There was no need to refer to acute conditions which were frequently amazingly overlooked. He told the story of his daughters who had been sent to a boarding school in the country in order to have the benefit of the fresh country air. There had been an intelligent medical officer and matron at the school. The elder daughter had suffered from recurring influenza. When she had returned home from school, he heard her coughing all night. The cough had been unaffected by change of posture. She had complained that she had pain like toothache. He had diagnosed pus in the antrum. The antrum had been washed out on several occasions and the patient had been cured of the condition. The second daughter had suffered from the same sort of influenza and although messages had been received from the school that the girl was getting on quite well, the elder daughter had decided to investigate the condition. She had telephoned to her father that the girl had double antrum infection. After several washings out the antral condition had subsided and the patient had had no recurrence of the trouble. He told this story to illustrate how the matron and the medical officer had been deceived and overlooked the diagnosis because they had not thought of the antrum in a case in which the correct diagnosis had been made by a mere child.

Reference had been made to tonsillar infection and he (Sir Richard Stawell) had referred to antral infection. The converse was true and the frequency with which chronic infection of the tonsils was found in pulmonary tuberculosis, should be noted. He had seen consequent recurring tragedies associated with those people in whom a medical man decided that a cold was associated with upper respiratory tract infection because there was gross tonsillar disease and decided that tonsillectomy should be done. Following the operation the tuberculous disease spread rapidly. He warned his hearers to apply the lesson learnt to every possible upper respiratory tract infection in order to exclude pulmonary tuberculosis. They should remember that obvious inflammation of the tonsil might be associated with pulmonary tuberculosis.

Dr. E. Gutteridge (Melbourne) said that as an oto-rhino-laryngologist he wished to refer to the primary importance of upper respiratory tract infections in non-tuberculous infectious of the lung. This was a point that everybody had learnt. He would not emphasize the matter further except in connexion with people who were supposed to have been gassed. At a repatriation hospital he had found that more than 20% of the men pensioned on account of gas infection were suffering from sinusitis. Dr. Gutteridge felt that bronchoscopy was a necessary adjunct to diagnosis and treatment in these conditions. Bronchoscopy permitted the surgeon to see what was actually happening in the air passages. He could see the tuberculous mucosa, the bronchi corroded with pus in bronchiectasis or the granulation of abscess. He could demonstrate the causative organism and if necessary prepare a vaccine. In treatment the results of Chevalier Jackson associated with MacCrae were very good. The methods of treatment of abscess of the lung were by suction and removal of gross amounts of pus and granulation. In bronchiectasis, however, the method was not so successful, but at times there was remarkable improvement in well-being after bronchial lavage. He quoted the case of a dentist who had been suffering from a long standing bronchiectasis. His bronchi had been washed with silver nitrate and various other solutions; remarkable improvement followed. Dr. Gutteridge felt that bronchoscopy had not received the attention to which it was entitled. The technique required the assistance of a specially trained man to hold the patient straight so that the bronchoscope could be inserted in the correct fashion. He suggested that it would be wise to set aside a special clinic or one man in each hospital for all bronchoscopic work. Such clinics had been formed in England and the United States of America.

Dr. Cotter Harvey (Sydney) said that there were only a few minutes left, but he would like to mention a few points. The importance of upper respiratory tract infections in bronchiectasis had been previously mentioned, but he would like to ask the oto-rhino-laryngologist to seek the aid of a physician for all patients with cough treated with antral lavage. He emphasized the importance of skiagrams after the injection of a contrast medium such as "Lipiodol" in diagnosis and in indicating lines of treatment. He referred to phrenicotomy. Bronchiectasis was a common disease both in adults and in children. He agreed with Dr. Cowan that physical signs were important, but he had found that at times physical signs were absent and the skiagram did not reveal any abnormality. In these patients a bronchogram showed the presence of bronchiectasis.

Dr. Harvey then showed several bronchograms.

Dr. D. Galbraith (Melbourne) gave an account of the chronic infections of the respiratory organs encountered in the Children's Hospital, Carlton. He stated that about 30% of the out-patients in the winter time were suffering from chronic catarrh of the respiratory tract. The signs were cough, frequent colds, bronchial attacks and varying degrees of failure to thrive. He did not think that tuberculosis played a large part in the production of this condition in children under ten years of age. He distinguished chronic bronchitis, unresolved pneumonia and pulmonary fibrosis and bronchiectasis. The mucous membrane of the respiratory tract from the naso-pharynx to the alveoli was continuous and it was therefore necessary to regard it as a whole. There was an initial reaction in the nose and throat in all the infections. The inflammation spread rapidly and when it subsided, it left some damaged tissue. If the child could repair the damage completely, nothing further occurred. The infection might persist in the accessory sinuses, in the bronchi or in the lungs. Each subsequent attack inflicted fresh damage, increased the amount of bronchitis, delayed the resolution of the pneumonic area and eventually led either to a chronic bronchitis or to fibrotic lung or even bronchiectasis. He was convinced that in children the acute condition existed at first and also that once chronic bronchitis appeared, it remained and did not proceed to fibrosis or bronchiectasis. The factors that militated against normal healing were persistent infections in the upper respiratory tract, poor general health and physique, poor hygienic surroundings and deficient diet, constitutional factors, the nature of the original infection, the presence of a small amount of pus in the thorax, the presence of a foreign body in the bronchial tree and pyorrhœa. In regard to infection he stated that pulmonary reinfections occurred either through the trachea and bronchi or more rarely from the naso-pharynx and the cervical glands. Deficiencies of diet and hygiene might give rise to metabolic errors. The lowering of the calcium and phosphorus content of the blood might occur. The two most common constitutional factors were syphilis and tuberculosis. Neither, however, was important in the causation of these pulmonary infections.

In discussing the clinical aspects of chronic bronchitis, Dr. Galbraith recommended that the diagnosis should be confirmed by X ray examination and the injection of "Lipiodol." He also discussed the signs of bronchiectasis. Hæmoptysis occurred in 5% of his patients, clubbing of the fingers was seen in a few children with advanced disease. The general nutrition of the children was remarkably good as a rule. Cyanosis varied in degree, but was usually present after exercise. Dyspnœa was present when much lung tissue was involved. The physical signs were not always characteristic unless the disease was advanced.

At times it was impossible to differentiate between pulmonary fibrosis and bronchiectasis. In another group of patients the result of an acute respiratory infection was an area of delayed resolution or of pulmonary collapse. In the differential diagnosis tuberculosis could be distinguished as it was a more acute condition. The age incidence in tuberculosis was higher and the response to the von Pirquet test produced evidence. In tuberculosis the upper lobe was usually affected, while in fibrosis it was the lower lobes. The question of exposure to infection also provided some evidence in favour of tuberculosis. Skiagraphic evidence was valuable at times, but it was extremely difficult to interpret the chest skiagrams of children. In tuberculosis the oxygen content of the blood was normal, while in fibrosis there was a diminished amount of oxygen. Lastly, much help was gained in the differentiation between tuberculosis and fibrosis of the lungs by the employment of "Lipiodol" injections. The other conditions to be taken into account in the differential diagnosis were pleural effusion and empyema, hydatid cysts and malignant disease of the lung.

The treatment consisted of general hygienic measures, the carrying out of breathing exercises, attention to infection in the nose, throat, accessory sinuses and teeth, calcium combined with ultra-violet or other light treatment, vaccines for repeated colds and "Lipiodol" injections. In regard to surgical treatment Dr. Galbraith had found that the induction of pneumothorax and thoracoplasty were at times of value in keeping the children with bronchiectasis more comfortable.

The Bite of Latrodectus Hasseltii.

Dr. C. H. Kellaway (Melbourne) read a paper on the venom of *Latrodectus hasseltii*. He had carried out some investigations on laboratory animals. Of six guinea-pigs subjected to the natural bite of the spider, five had died. *Post mortem* examination of the animals revealed hæmorrhages into the lungs which were otherwise pale and swollen and failed to collapse when the chest was opened. The blood had been fluid and its clotting time normal. The intestines had been congested. Three rabbits had been practically unaffected by the bites. Experiments had also been carried out with saline solution extracts of the head and prothorax of spiders. The results had shown that the soluble matter extracted from two heads was somewhat less potent than the venom injected at a single natural bite. The symptoms and *post mortem* findings in those animals which died, had been identical with those observed in the less acute deaths following natural bite. The results following the injection of extract of body differed according to whether it was administered subcutaneously or intravenously. Subcutaneous doses produced intense spreading œdema of the abdominal wall, wet pleural and peritoneal surfaces and multiple hæmorrhages in the lungs. Intravenous injections in large animals produced death with symptoms of collapse and without obvious obstructive symptoms. Smaller animals died rapidly with symptoms which were more definitely obstructive in type. The symptoms were not very different from those seen in acute anaphylactic shock. When the brains of guinea-pigs were destroyed under full ether anæsthesia and extracts were injected into the jugular vein after the anæsthetic had been blown off by artificial ventilation, extracts of the head caused death in the guinea-pig from bronchial constriction and body extracts acted on the heart causing rapid failure. Extracts were tested on the uterus of the virgin rat and it was concluded that the effect was not due to histamine.

Dr. H. O. Lethbridge (Narrandera) described the effects of the bite of *Latrodectus hasseltii* in man. He said that after an interval which might be as short as thirty minutes or as long as ten hours, the severe symptoms made their appearance. In his series of patients the average time had been two hours. Pain was severe and might last several days. In his patients the pain had been most pronounced in the lower extremities, regardless of the position of the bite. Weakness was present and most noticeable in the legs. Sweating was profuse and might last for hours. Nausea was constantly present. Frequency of micturition was present in most instances and was not confined to those patients bitten on the genitals. Treatment might be summed up in the statement that steps should be taken to combat shock and to treat symptoms. He looked forward to the time when an antivenene would be available.

Dr. A. W. Holmes à Court (Sydney) wished to express his appreciation of the excellent papers by Dr. Kellaway and Dr. Lethbridge. The work was most important, because there were certain discrepancies that needed elucidating. Dr. Holmes à Court asked Dr. Kellaway if there was an individual susceptibility to the spider bite such as was present in the bites of sand flies. The diversity of reports suggested that this was possible. He recalled a patient, a middle-aged man, in whom it had been suggested that the bite of a red backed spider was responsible for the symptoms. The patient had been bitten in the classical way on the scrotum. A red mark had been present in that region and the patient had complained of pain. Subsequently an intense local reaction with bleb formation had appeared and the bacillus of malignant œdema had been isolated from the local lesion. The patient had died. Dr. Holmes à Court considered that probably death was due to the bacillus of malignant œdema rather than to the bite of a red backed spider.

Dr. G. M. B. Hales (Dungog) said that he was grateful to the speakers, particularly as he was probably the cause of a storm of discussion when he reported an unusual case in The Medical Journal of Australia on February 11, 1928. The bites reported were of the classical type and the patients had suffered from intense pain. In his patient the pain had been local. In none of his patients had the red back spider bite been of the classical variety. Several had been bitten on the limbs and neck. After the bite on the hand the pain had been acute and had spread up to the shoulder. The child had been bitten on the hand, had not complained of any pain and had been driven a hundred miles in a motor car to his surgery. The parents had thought that the trouble was due to the red backed spider, because the child had been playing in the garden where red backed spiders abounded. Some eight to ten hours after the bite he had seen the child and she appeared to be normal. However, he had kept the child in hospital. No signs had appeared up to the following morning, but on the next afternoon the child had become drowsy and localized swellings on the face had appeared. Swellings had appeared and disappeared in various regions. Swelling had affected the glottis and the question of tracheotomy had been considered. On one occasion respiration had ceased. There had been no pain. The child had unquestionably been bitten by a red backed spider as the insect had been secured. Dr. Hales asked others to relate their experience as red backed spider bite was commoner in the country than snake bite. He stated that he had never seen a genuine snake bite.

Dr. C. T. Ch. de Crespigny (Adelaide) asked whether Dr. Kellaway considered there was any cause of death other than strangulation, such as a neurotoxin, and the *modus operandi* of the cause.

Dr. Holmes à Court asked advice as to the correct way of treating the patient apart from antivenene.

Dr. Lethbridge in reply said that children were apparently very infrequently affected because the spiders nearly always bit at night and the children were usually in bed at this time and therefore did not run the risk of being bitten. With regard to Dr. Hales's remarks he felt it was quite possible that the child might have died. He recalled two patients: the first was a young man of eighteen who had nearly died. He had administered morphine, strychnine and pituitary extract. The patient had been pulseless and sweating freely. Dr. Lethbridge had used strychnine for collapse in these conditions. The second patient had been bitten by a red backed spider on the arm. There was no doubt about the bite, as it had been seen and there was no doubt about the spider, as it had been caught. The man had been admitted to hospital; his arm had been incised; pyæmia had supervened and he had nearly died. A stiff elbow had resulted. Dr. Lethbridge could not think that all the symptoms were due to *Latrodectus hasseltii*. He thought as Dr. Holmes à Court did, that there must have been some other factor in the illness of his patients.

Dr. Kellaway in reply thought it remarkable that spiders with such unpleasant habits did not inject some bacilli with their venom. Bacterial infection had been noted, especially in the cases of bites from the South American spiders. He had been impressed on searching through the literature by the variation in symptoms. The general symptoms were as Dr. Lethbridge had described them. Pain was usually local at first, but often became widespread. Individual variation in the response of animals had been noted. It was important to remember that the bites in laboratory animals had taken place in the day time. All had died except the guinea-pig. It occurred to Dr. Kellaway that the red backed spider when biting at night might have been more irritated and would be attracted by the light in the cesspit. The spider came upon the patient when seeking for food; it was not a savage attack. In answer to Dr. de Crespigny, Dr. Kellaway said that the venom was very largely neurotoxic. Bronchial restriction was not essentially a feature and no doubt in man the action of the venom was largely due to a neurotoxin. With regard to the production of an antivenene, it was difficult to obtain a sufficient amount of the pure venom and also to obtain suitable animals. Other spiders, like the South Amercian spiders, produced similar results. In Brazil many antivenenes had been produced. Dr. Kellaway considered that it might be worth while to prepare an antivenene in Australia if the number of red backed spider bites became frequent. This was especially liable to happen in dry seasons. With regard to local treatment he approved of sucking or wet cupping as had been done by Dr. Lethbridge. It was impossible to apply a ligature to the regions usually affected; for regions like the arm ligatures and scarification might be of value. Experiments could be carried out on animals. The thing that impressed him in animals was the occurrence of pain or, rather, he thought that he noticed pain, shivering, squealing and later bronchial constriction. He was unable to explain the anomalous symptoms of which there was a large variety. In the treatment of pain morphine was essential. It was also necessary to keep the patient warm. He did not know how much good strychnine did given to patients in collapse, but would suggest that hot black coffee should be administered.

SECTION OF SURGERY.

Diverticulitis.

Professor F. Gordon Bell (Dunedin) in his address as President of the Section of Surgery discussed the subject of diverticulitis. Diverticulitis was sufficiently common to demand attention because of the difficult and dangerous complications that accompanied it. It stood next to cancer in importance among surgical affections of the colon. In regard to the pathology it was important to remember that the condition did not commonly occur before the age of fifty years and that it was after this time of life that muscular degeneration was likely to occur. Once diverticula had occurred, it was easy to picture the subsequent changes, retention of fæcal matter, formation of fæcoliths in the pouches with chronic or acute catarrh, perforation, inflammatory thickening in and around the affected segment, suppuration and adhesion to adjacent organs, especially the bladder. The pathological changes might be summarized as likely to take the predominant form of inflammation of the colon in or about the left iliac fossa, of perforation and peritonitis, of inflammation and fibrous hyperplasia, of causing some degree of stenosis of the affected segment and consequent obstruction, of vesicocolic fistula or of subsequent development of cancer in the affected segment or at the site of a vesical fistula. Professor Gordon Bell then discussed the various clinical types. He adopted the classification of Telling, of Leeds. Inflammatory trouble in the left lower quadrant of the abdomen was characterized by the development of an inflammatory thickening along the colon, often described as sausage shaped, tender to pressure and accompanied by fever, leucocytosis and a tendency to recovery and recurrence. General peritonitis was occasioned by spread from an acutely inflamed diverticular mass, by leakage from an associated abscess or through perforation of a diverticulum. Vesico-colic fistula was often complicated by an extensive pelvis abscess. Under the heading of pelvic syndromes were included conditions which brought diverticulitis into the province of the gynæcologist or the genito-urinary surgeon. Intestinal obstruction and the mimicry of carcinoma were often associated with diverticulitis. It was probable that diverticulitis accounted for most of the long-lived patients who had been subjected to colostomy for supposed cancer. Professor Gordon Bell then described five cases which had come within his experience, and discussed the significance of each. As far as treatment was concerned, he laid stress on the fact that medical treatment occupied a definite place and in selected patients might stave off indefinitely the necessity for surgical operations. It consisted in attention to the regularity of the bowel action by suitable diet and by the administration of paraffin, by lavage *et cetera*. He discussed surgical treatment under the headings of colostomy, the stage resection of Mikulicz, the isolation of the affected segment by an omental wrap and immediate laparotomy on account of perforation.

Dr. H. R. G. Poate (Sydney) related his own experience of diverticulitis. He had undertaken the resection of what he had regarded as a carcinoma of the colon; it had proved to be diverticulitis. He had seen it in the form of pelvic abscess and since then he had seen half a dozen abscesses following gangrenous diverticulitis. The clinical syndrome given by Dr. Bell covered the ground very well, but the common type was the one with left-sided abdominal pain; if associated with slight fever and leucocytosis, X ray examination usually confirmed the presence of diverticula. The most confusing cases were those in which the diverticula were found in unusual situations, as in a man with pain in the right loin which had been thought to be renal in origin or from the gall bladder. A skiagram had revealed diverticula of the whole colon with one large one in the region of the right hepatic flexure. In regard to vesico-colic fistula, this was generally due to diverticulitis. It had once been regarded as due to carcinoma, but the modern view was that it was more frequently secondary to diverticulitis than to carcinoma. The usual cause of death was secondary pyelo-nephritis. The pelvic syndrome might give rise to errors in diagnosis and these conditions were usually met with by the gynæcologist who frequently encountered them at operation. In regard to diagnosis, a mass, if present, was always tender. A tender mass in the right iliac fossa with pain, slight rigidity, slight fever and leucocytosis was almost diagnostic of diverticulitis. With reference to treatment, operation should be avoided, except for the relief of acute symptoms. In the medical treatment the use of paraffin, lavage of the bowel and intestinal antiseptics played a part. Diet should be restricted and the patient should reduce his weight. Adiposity was a large factor in the condition. Apart from colostomy, isolation of the omentum seemed to be the best method of dealing with it. It was useless to resect one portion, if the whole of the bowel was affected. Diverticula, when acutely inflamed, were often not seen in the skiagram, as the mouth of the pouch was often closed by the inflammation.

Dr. Bronte Smeaton (Adelaide) recounted four cases in which the source of the affection had been discovered at operation. In two of the patients abscess formation had taken place before he had seen them. In each the condition had been diagnosed as appendicitis. Both recovered after drainage. One of the patients had had recurring and increasing intestinal obstruction. At the operation it had been found that there was distortion and adhesions of the loop of ileum at the site of the drainage. Excision and anastomosis had resulted in cure. The third patient had been seen at the Adelaide Hospital and the condition had been investigated in the usual manner. Occult blood had been found and a distortion of the descending colon. The diagnosis of cancer had been raised on account of the size of the mass and diverticulitis had been suspected. At the operation twelve and a half centimetres (five inches) of the descending colon had been found to be affected. The *appendices epiploicæ*, instead of hanging free, had been flattened out and applied to the bowel, rendering it almost a rigid tube. The wall seemed to be

fortified in this way against perforation. The inflammation had resolved and the patient had remained well for at least a year. The fourth patient had a condition that had been diagnosed as an abscess of the left flank due to diverticulitis. It had been drained from the left side, but the patient had died. All the patients had been middle aged, but not obese. The two with pelvic abscesses were hard working, rather spare people; one was a woman about sixty-eight years of age.

Dr. F. A. Hadley (Perth) said that the ætiology was not definite. Diverticulitis was possibly a congenital condition or it was due to changes in the glands. The former was more probable. The patients came under observation either on account of periodical attacks of pain and colic, on account of acute obstruction simulating that of carcinoma or on account of acute septic trouble of the lower part of the abdomen. The treatment in the first group should be medical, for the second colotomy, if essential, otherwise expectant treatment. Colotomy should not be transverse, as the transverse colon might be required later for junction during a resection. In the majority of cases caecostomy would be sufficient. In the treatment of septic trouble, provided that satisfactory drainage had been established, the less that was done, the better. Dr. Hadley had found it extremely difficult to save these patients.

Dr. H. Rutherford Darling (Sydney) stated that the condition as seen by him had assumed the type of irregular appendicitis or the type of a localized tumour in the descending or pelvic colon. He could not understand why Dr. Poate had experienced difficulties at resection. In inflammatory conditions there was a deposit of fibro-fatty tissue around the bowel. Was the fat nutritional or inflammatory in origin? The fat caused difficulty in resection. If colostomy were carried out and the bowel left open, the lumen was often reduced and might contract to the size of a goose quill. It then became impossible to close the colostomy opening. He had seen many uncomplicated diverticula which had given rise to no signs during life and had been discovered at the *post mortem* examination. He had tried to reproduce this condition by performing appendicostomy and washing out the bowel twice daily for nine months. This had been done in two patients and the results checked by radiological examination. The symptoms had disappeared gradually. He had not seen such advanced diverticulitis as Professor Bell had described.

Dr. H. S. Stacy (Sydney) stated that, as other speakers had noted, diverticulitis usually occurred in males over forty years of age; the patient was as a rule well nourished. He had, however, seen a patient between twenty and thirty years of age, who had died of general peritonitis. At the autopsy perforation of what appeared to be a single diverticulum low down in the pelvic colon had been found. There had been no signs of thickening usually characteristic of peridiverticulitis. He recalled a case recorded by Dr. Inglis and himself in 1924 in which the whole of the descending colon had been converted into a mass of fibrous tissue; the lumen had been almost obliterated. Although he had described this condition as fibrosis of the colon, he had little doubt that it was actually a late stage of diverticulitis with peridiverticulitis. He pointed out that the irregularity in the shadow after a barium enema and radiological examination was of greater extent than in carcinoma. It was not easy to be certain about this. He recommended that a skiagram should be taken twenty-four to forty-eight hours later when the diverticula could be more clearly seen. There was one complication that had not been mentioned. It was a communication between the colon and the vagina resulting from a pelvic abscess. In the absence of complications medical treatment should be employed. The most useful drug was liquid paraffin. Irrigation of the pelvic colon with saline solution was useful either through an appendicostomy opening or *per rectum*.

Dr. George Bell (Sydney) stated that he had treated five patients with diverticulitis by surgical means. In three there had been symptoms of obstruction. In one patient there had been diverticulosis affecting the pelvic, iliac and descending colon with acute angulation due to adhesions. Some bands had been divided and the obstruction relieved. In the second patient the obstruction had been due to stenosis of the iliac colon; proximal to this a diverticulum had almost perforated and had been covered with lymph. The affected loop had been isolated, brought out through a gridiron incision and a colostomy opening had been established. In the third patient the sigmoid loop had been affected. This had been excised and colostomy performed. Convalescence had been complicated by a pelvic abscess which had been drained through the vagina. In the fourth patient the obstruction had been in the pelvic and iliac colon. The condition had been diagnosed as carcinoma; its true nature had been discovered by the pathologist. In the last patient there had been acute generalized peritonitis due to a perforation of the iliac colon. He was of the opinion that it was advisable in these conditions to perform colostomy proximal to the perforation. The main difficulty in diagnosis was to distinguish between carcinoma and stenosis due to diverticulitis.

Dr. R. A. H. Fulton (Dunedin) gave some details in regard to three patients. The first was a woman, aged forty-five, with an acute abdominal condition; laparotomy had been performed and peritonitis affecting the lower portion of the abdomen due to perforation of the diverticulitis of the colon had been found. She had recovered after drainage of the pelvis, although the convalescence had been stormy. The second patient was a man, aged sixty-four years, with a recto-vesical fistula. He refused operation, perforation had taken place and the patient had died before anything could be done for him. The third patient was a woman, aged twenty-eight years, who had suffered from constipation and a tender mass in the iliac fossa complicating a retroverted gravid uterus. He regarded the condition as peridiverticulitis occurring at an earlier age than usual. He was of the opinion that sigmoidoscopy was attended by some danger. One patient had died two days after the passage of the sigmoidoscope.

Dr. L. M. McKillop (Brisbane) stated that many years previously he had operated on patients for suspected cancer of the colon and had found these patients alive and well several years later. In the absence of complications he thought that medical treatment was safer for these patients. They should avoid food which caused intestinal flatulence. He recommended repeated washing out of the colon before an X ray examination was necessary. In regard to the ætiology of the condition he suggested that there was a congenital basis. Increased intracolonic gas pressure gave rise to herniæ of the mucosa through apertures in the muscularis. The fæces stagnated in these herniæ and gave rise to attacks of acute inflammation.

Dr. Victor Hurley (Melbourne) stated that in his experience the presence of signs of infection in the left side of the abdomen with fever, a tender mass, rigidity and leucocytosis was frequent when there was leakage and infection due to carcinoma. Even at operation the differential diagnosis between carcinoma and diverticulitis was often very difficult. He suggested that stricture of the rectum might be found to be the result of a late stage of infection commencing in the upper part, spreading through the perirectal tissues and followed by fibrosis and increased formation of fibrous tissue with narrowing of the lumen of the bowel. It was rare to discover any clinical or serological evidence of a syphilitic or gonorrhœal infection in these patients. He held the opinion that sigmoidoscopic examination of a patient suspected to be suffering from diverticulitis was dangerous, since infection was often present. Radical surgical measures should be avoided when infection was present. When signs and symptoms of obstruction appeared, drainage of the abscess cavity and of the bowel should be undertaken.

Professor B. T. Edye (Sydney) mentioned two forms of diverticulitis of the duodenum which he had treated. In the first the diverticulum had been situated in the second portion of the duodenum and had led to perforation. Urgent symptoms had demanded immediate operation. The diverticulum had been resected and the patient had recovered. In the second patient the diverticulum was situated in the third part of the duodenum and had been packed with tomato skins. A tumour had been formed, measuring nearly four centimetres in diameter. He had removed the tumour. He had further encountered a

diverticulum of the caecum. This had contained a large fæcal concretion and had given rise to symptoms resembling those of acute appendicitis. He referred to diverticula of the pelvic colon and stated that he agreed with the previous speakers in regard to the treatment. He did not agree with Dr. Hurley that diverticula occurred in the rectum.

Dr. V. M. Coppleson (Sydney) said that the surgical aspect had been very fully discussed, but the question of diet had not been debated. A strictly vegetable diet, but no nuts, and large doses of paraffin were usually recommended. Olive oil should be run into the bowel before retiring and retained until the morning. Two of his patients had been found to have gangrene of a single *appendix epiploica;* in each the diverticulum had been resected. In the first patient the diverticulum had been situated in the caecum and he had recovered. In the second patient it had occurred in the sigmoid; resection and drainage had been performed, but the patient had died. Colostomy might have been done with advantage.

Dr. B. T. Zwar (Melbourne) emphasized the desirability of avoiding operation except when it was absolutely necessary. He discussed the ætiology and thought that there was some comparison between diverticulitis and the diverticula occurring in the duodenum. Those occurring in the second and third part of the duodenum were congenital in origin, while those in the first part of the duodenum were evidently due to herniation through the weak part of the duodenal wall. He had resected such a diverticulum and sections of this had shown the absence of muscular tissue. It probably corresponded to the pulsion diverticula of the œsophagus.

Dr. Gordon Bell replied. In reference to the origin of the diverticula he thought that no one method of origin could account for all instances and the subject of ætiology was somewhat vague. He did not believe that diverticula were present when the patients were born. In reference to the question of diet he advised the use of abundant fruit and vegetables, the exclusion of nuts and the elimination of meat. Sigmoidostomy was contraindicated if there was inflammation. A leaking carcinoma was not uncommon and might give rise to slight fever and leucocytosis. Rectal stricture was a difficult subject to discuss. Diverticula of the rectum were occasionally met with, but they were extremely rare. He doubted if they had much bearing on rectal stricture. In reference to Dr. Bell's question regarding necessity for colostomy after perforation and subsequent suture, he did not think that colostomy was necessary. It was a matter for nice decision for the surgeon whether to close a colostomy or to leave it alone when there was a stricture. One of the speakers had referred to sigmoiditis. This was a vague term. He doubted if sigmoiditis was a definite entity; it was probably due to diverticulitis.

Carcinoma of the Colon.

Dr. Victor Hurley (Melbourne) read a paper on carcinoma of the colon. He based his remarks on an analysis of eighty-one cases occurring at the Melbourne Hospital during the period 1921 to 1925. He compared his series with those of Carson who reported 110 cases, and Burgess who reported 259 cases. The figures for the distribution of growths in the colon showed that carcinoma was roughly five times more frequent in the left half of the colon than in the right. The massive fungating type might be found almost equally in any portion of the colon, but the ring type was more frequently seen in the left half. This with the smaller lumen of the left half and the more solid nature of the fæcal contents explained the increased likelihood of obstructive symptoms and signs occurring in the left half. Intestinal obstruction was eight times more frequently due to left-sided growths than to right. In his series of eighty-one cases peritonitis had been present in twelve instances and eleven patients had died. Dr. Hurley confined his subsequent remarks to diagnosis and the treatment of obstruction. Under the heading of diagnosis Dr. Hurley described the onset of the various symptoms and enumerated the points which might be made clear by inspection and palpation, rectal examination, sigmoidoscopic examination and X ray examination. He said that when reasonable doubt existed, laparotomy should be undertaken, even when special investigations, including an expert X ray examination, had failed to reveal a definite lesion. They were inclined sometimes to lean too heavily on the radiologist and to expect him to take the responsibility of making the decision which should be made by the clinician. In regard to obstruction of the colon, 25 of the 81 patients had been admitted to hospital with acute intestinal obstruction and in twelve perforation had been present. In five perforation had been present in the caecum, in one in the hepatic flexure, in one in the splenic flexure, in two in the descending colon and in three in the sigmoid flexure. In regard to treatment, it had to be determined whether an absolute obstruction existed and if one existed it had to be determined whether the obstruction was in the large or small bowel. If the obstruction was in the large bowel, it had to be decided whether the general condition of the patient permitted of a general anæsthetic being given and a laparotomy being undertaken. If it did, operation should be performed without delay. If the growth could be removed and there were no secondary deposits, the obstruction might be relieved by caecostomy, by Paul's method of colostomy or by lateral anastomosis. If a radical operation was not possible, either because of the local condition or of secondary deposits, the obstruction might be relieved by permanent colostomy or lateral anastomosis. If an exploration of the abdomen under a general anæsthetic was not advisable, either owing to the general condition of the patient or to the degree of intestinal distension, and the obstruction could reasonably be located in the colon, blind caecostomy or colostomy might be carried out.

Dr. B. T. Edye (Sydney) congratulated the speaker and thought that he had covered the ground very thoroughly. There was the greatest difficulty in getting the patients early enough and they had generally suffered for six months or longer when first seen. The public needed educating in this matter and particularly concerning the need for examination when difficulty with the bowels arose past middle age. With regard to caecostomy, it was at times disconcerting to find that the caecum was fixed and would not come up to the abdominal wall. He asked Dr. Hurley what he did in this difficulty. He regarded blind caecostomy necessary only when laparotomy was not possible. This could be judged only by the general condition of the patient and the condition of distension. Growths improved considerably after colostomy; some which at first appeared to be inoperable, were later found to be quite operable.

Dr. H. B. Devine (Melbourne) stated that there was a note of pessimism which has been running through surgical work for four or five years in regard to malignant disease. If there was one disease in which surgery offered a good outlook, it was malignant disease of the colon. This note of pessimism should be dissipated. He spoke of one patient who was quite well thirteen years after operation. There were two types of carcinoma of the bowel, the papillomatous type which had the tendency to form a tumour and was not invasive and was much more amenable to operation than the ring type which was often invasive. The question of intestinal obstruction in carcinoma of the bowel was important. It occurred in the left side in 60% of the patients and he expressed the hope that some attention would be focused in the discussion on the management of the obstruction. He thought that it was the surgeon rather than the public who needed education in this matter, as obstruction frequently occurred from five to seven days before surgical treatment was considered. It was common to wait for from five to six months before a diagnosis was made. Even if the patients were not examined radiologically, the test for occult blood should always be carried out. The whole object of treatment was to save the life of the patient. As the patients were seldom seen in the early stages, the surgeon had difficulty in deciding what he should do. If jejunostomy were performed, it was important to decide whether the opening should be made low down or not. In making the incision, the surgeon was frequently able to ascertain the condition of the patient. At times the tissues felt like

soap when cut. This was due to lymph stasis; the patient in these circumstances was likely to die. Every effort should be made to combat this obstruction; if a loop were pulled out, it should be opened at once. He said that he was not a believer in caecostomy, but favoured the principle of a left-sided attack for left-sided growths. A frontal attack should not be made in the presence of much distension. In regard to the anæsthetic it seemed almost a fetish that when the patient's condition was desperate, ethylene or nitrous oxide should be used. Local anæsthetic caused 30% more deaths than ordinary methods of anæsthesia. With a lateral attack and the lightest possible ether anæsthesia the distended intestine could be better managed and the shock more easily combated. He was inclined to go back to the old method of anæsthesia which he thought gave better results. He used to dread operations on the large bowel, but since adopting a modification of the Mikulicz or Paul operation he no longer feared it. He left out 6·25 centimetres (two and a half inches) of both loops. Next day he put a clamp on the spur and closed the efferent end and a few stitches in the afferent end, leaving an opening just sufficient to allow the intestinal contents to pass. Several days later he removed the clamp and the mucous membrane pouch. He cut off the mucous membrane, inserted a few more stitches and repeated this until the opening was closed. With this procedure the colostomy remained open for no longer than ten days.

SIR HENRY NEWLAND (Adelaide) stated that a bismuth enema should be given to all patients with acute obstruction and a skiagram taken. This revealed both the presence and the site of the obstruction. If this plan were adopted, the necessity for blind caecostomy would be avoided.

DR. JOHN KENNEDY (Melbourne) stated that in the majority of patients the symptoms had been present for twelve to eighteen months before they were first seen. Some complained of dyspeptic pain over the whole abdomen. Others suffered from diarrhœa and were usually treated for colitis. Others again complained mainly of bleeding and were often treated for hæmorrhoids. In colitis and cancer there was oozing of blood intimately mixed with fæces in the lowest part of the rectum. In hæmorrhoids and fissure the blood was unmixed. He referred to the value of the sigmoidoscopy in the diagnosis of cancer of the rectum and colon and especially in the differentiation between cancer and colitis. There was some difficulty in obtaining clear evidence from the skiagrams.

Dr. Hurley in reply stated that the difficulty of caecostomy when the caecum was fixed, was a very real one, but it was generally found to be possible to isolate a part of the wall of the colon with a wall curved clamp and to insert a double row of purse string sutures around a tube. The caecum with the tube was then allowed to drop back in the abdomen with a little light gauze packing. He agreed that Dr. Devine's procedure in left sided growths was a very valuable method. He did not think the jejunostomy would be very effective when draining the colon was required, but he could not speak from much experience of it. The use of the barium enema was sound and although it might be difficult to apply in private practice, it should be employed as a regular procedure.

Follow-Up Systems and Their Results.

DR. R. A. H. FULTON (Dunedin) read a paper on follow-up systems and their results. He said that a follow-up system was one in which an attempt was made to carry out a routine examination of practically all patients every few months after their discharge from hospital. It was unnecessary to reexamine patients whose illness had been of only a minor character. Every hospital staff should therefore decide for itself which types of patient might be excluded. The organization of a follow-up system consisted in the allotting of patients to the group of those who should be traced, in the stimulation of the interest of the patient in the system, in the sending out of letters periodically to the patients, in the examining of patients, recording results and allotting a date for the next visit. It was essential to the system that good case records should be kept and that the staff as a whole should take a keen interest in the scheme. It was advisable to have a special time and place for the examinations rather than to conduct them in the wards or out-patient department. Dr. Fulton gave typical results of the system that had been obtained in several clinics.

Head Injuries.

DR. V. M. COPPLESON (Sydney) read a paper on head injuries. He said that the manner of recovery of the patient to consciousness was important not only for purposes of record, but for prognosis and the indications of treatment. These changes could be charted. The changes in consciousness which occurred in a patient recovering, occurred in a definite order or stages. They were best considered in the reverse order: full consciousness, dulled consciousness, drowsiness, semi-consciousness, light unconsciousness, deep unconsciousness. There were four main types of chart, those of the recovering patient, the fatal type, the type due to cerebral œdema, the type almost certainly due to hæmorrhage. In the recovering patient recovery was not gradual, but proceeded up to a point usually referred to as the stage of reaction. Here the patient made a sudden stride up the scale of consciousness. Consciousness might not be fully recovered, but merely occurred up to a certain point after which it was slowly recovered. No operation should be carried out on these patients while they were in the stage of shock. The chart of the second type was that of the moribund patient. These patients were comatose on admission and 60% of them were dead within twelve hours. They were frequently the subjects of injudicious surgery. In the type due to cerebral œdema recovery ensued up to a certain point and then either the patient's condition remained stationary or he dropped back slightly and remained in that state. A well recognized type of this condition was cerebral irritation. This might be treated either by the use of hypertonic solutions or by lumbar puncture. If no improvement resulted, operation should be undertaken. In the type due to hæmorrhage some recovery usually occurred and following this a decline took place which was progressive. In fracture of the skull the fracture should not be regarded as of primary consideration, but rather as a complication of the cerebral state. In fracture of the skull the treatment of shock should take precedence over any operative interference.

DR. A. J. OPIE (Lismore, N.S.W.) stated that he regretted that more detail had not been given in regard to the saturated solution of magnesium sulphate.

A member asked concerning the standards for divisions of the cases into the various classes.

Dr. Coppleson in reply gave the details of the use of saturated solution of magnesium sulphate. He stated that the broad division into the upper and lower half of the scale of consciousness was not difficult. Whilst there was no difficulty in telling dull consciousness, some difficulty might be experienced in distinguishing between drowsiness and semi-consciousness. Drowsiness was taken as a condition in which the patient was in a more or less sleepy condition, but could be roused from it more or less completely and induced to answer questions. Semi-consciousness was a further degree of this state and while the patient was sufficiently conscious to be roused, he would not answer questions. When it was not possible to decide whether the patient's condition belonged to the one or other of these two states, a point should be marked between the two in filling in the chart.

Renal Tuberculosis.

DR. REGINALD BRIDGE (Sydney) read a paper on renal tuberculosis. In regard to the pathology he raised the question as to whether healing of renal tuberculosis ever occurred. He said that it was quite usual to find the kidney converted into a fibrous and caseous mass with areas of calcification scattered through it. This was an attempt at healing, but there had never been demonstrated either at autopsy or operation a kidney in which the healing process was complete. The question of healing was of fundamental importance, for on it that of treatment

depended. The urologist believed that definite unilateral tuberculosis called for nephrectomy, but some physicians pinned their faith to tuberculin and other therapeutic measures. Dr. Bridge excluded from his remarks patients with advanced pulmonary or other tuberculous infections in whom genital or urinary tuberculosis developed as a complication. In dealing with the question of diagnosis, Dr. Bridge referred to guinea-pig inoculation. Persistent failure to find tubercle bacilli in the urine and a normal guinea-pig after inoculation could for practical purposes exclude tuberculosis. There was one drawback to the inoculation test of guinea-pigs and that was the fact that a superadded infection by some other organism was often present. These organisms killed the guinea-pigs from septicæmia in a few hours. He had not found the test of great practical importance. In all urological conditions it was the duty of the medical attendant to have a radiological examination made of the whole urinary tract. Cystoscopy was the one essential and fundamental procedure in the diagnosis. It revealed whether the bladder was involved or not and, if so, to what extent. It also revealed whether one or both kidneys were involved and whether the patient had another kidney. The functional capacity of the healthy kidney could be determined and without this knowledge removal of the diseased kidney could not be undertaken. When the disease was definitely unilateral and the functional capacity of the other kidney was good, nephrectomy was indicated. Even when the kidney was removed, it had to be remembered that the primary focus remained. He always insisted on thorough medical treatment and advocated the use of tuberculin. Even when the bladder was involved, if only one kidney was affected, the bladder tended to heal after the kidney was removed.

Dr. E. S. Meyers (Brisbane) complimented Dr. Bridge on his paper and quoted a case in which perirenal abscess had occurred and asked if this complication was common.

Dr. R. G. S. Harris (Sydney) stated that the symptoms of strangury were due to a rigid ureter and this symptom was greatly relieved by nephrectomy. In a large number of patients the ureter could be felt bimanually. Very free bleeding and moderate distension of the bladder should always put one on guard against tuberculosis. Further, when pus was found without bacteria, it was generally due to tuberculosis. In bilateral pyelograms in suspected tuberculosis of the kidney it was usually found that the pelvic part of the ureter was straight on the affected side, while on the other side the normal curve was seen. The risks of pyelography were somewhat exaggerated in these conditions, but the injections should be stopped on the slightest discomfort.

Dr. Bridge in reply said that he had had experience of perirenal abscess, once secondary to a tuberculous lesion of the kidney and once due to Pott's disease. In regard to pyelography he did not think that it should ever be done with a patient under an anæsthetic. If necessary the catheter should be inserted while the patient was under the influence of an anæsthetic, but the pyelogram should not be taken until the patient had regained consciousness.

Alleged Simple Adenomata.

Dr. H. R. G. Poate (Sydney) read a paper in which he discussed the so-called simple adenomata. Although he referred to adenomata in general, he paid particular attention to those of the parotid, the breast and the thyreoid. He said that malignancy was not the only criterion as to whether a growth was doing harm to its host. He showed that a large proportion of malignant tumours of the parotid arose from degeneration in an old standing adenoma. Unless so-called simple tumours of the parotid were removed early, there was a tendency to recurrence and if this occurred, malignant changes were prone to develope. Early surgical removal should always be advised. In regard to the breast, Dr. Poate referred to cases in which apparently simple adenomata had been in existence for years, but had taken on a sudden new growth which turned out to be a carcinoma. The practice advised by some surgeons of making an exploratory incision into a breast tumour of doubtful malignant character was abhorrent to him in view of the knowledge of the implantation of carcinoma and of the fact that it was easier to disseminate a damaged growth than an intact one. In the thyreoid particularly tumours not only caused mechanical disabilities in regard to the comfort and the appearance of the patient, but they interfered with the functional activity of the gland. Adenomata or their fibrous or cystic variations were all potential foci on which carcinomatous or other malignant changes might occur. It was the duty of surgeons to warn patients of the dangers of allowing such tumours to remain unoperated on. He thought that morbid anatomists should discard the terms simple or benign in describing such tumours and if they wished to imply that no malignant change was present in the growth, they should state in unmistakable terms that it was non-malignant.

Dr. H. B. Devine (Melbourne) stated that surgeons were far too prone to regard adenomata in any organ as simple. He did not think they could safely leave any adenoma of the thyreoid, as they were malignant in the metaphasic way described. He would like to have heard discussed the question of surgical approach to tumours of the parotid.

Dr. B. T. Zwar (Melbourne) stated that he had been interested in the remarks concerning the parotid glands and concerning quiescent tumours becoming malignant. The rapid increase in size often led to a mistake in diagnosis. It was essential that the patient should be warned of the danger; the tumour must be removed at all costs. In regard to the question of the presence of cartilage, this was stated not to be cartilage, but merely mucinous material. When doubt existed, it was usually found that tumours of the breast were malignant. Frozen sections were not favoured by Professor Shattock. The Dudgeon wet film method appeared to be worth trying. He could not agree with Dr. Poate concerning the pathology of thyreoid adenomata and the distinction between Graves's disease and toxic adenoma. He favoured the English view of Fraser and others and their classification and thought that they were more in keeping with clinical experience. It was often difficult to be certain whether they were dealing with a toxic adenoma or Graves's disease.

Dr. R. A. H. Fulton (Dunedin) stated that in breast tumours he thought that the terms adenoma or carcinoma should not be used, but merely the term "dangerous breasts." In regard to the end results, in cases of tumour he thought that the reason why there were better results in private than in public was probably because of the handling of the tumours by students giving rise to dissemination.

Dr. Victor Hurley (Melbourne) stated that there were three glands selected for discussion. There was a great difference in the three. Tumours of the parotid were frequently found in quite young people. They were teratogenous tumours and quite different from the tumours of the breast and the thyreoid gland described. It was unusual for an adenoma to form in a perfectly normal breast or thyreoid gland. It was not a purely local change. The underlying process was unknown and there was more involved than a purely local change. Excision of the tumour and of a considerable amount of the surrounding area was preferable to local excision. He agreed with Dr. Zwar that the English classification of Williams and Pearce was to be preferred to the American one of Plummer.

Dr. L. M. McKillop (Brisbane) stated that he always regarded malignant disease as due to one or more of three causes, chronic irritation, development of an embryological rest and heredity. It was his practice to recommend removal of those structures in which adenomata occurred. It was better to remove the whole breast with a fair sized adenoma than to run the risk of a local removal.

Dr. Gordon Bell (Dunedin) congratulated the speaker on the specimens which he had shown. He stated that the specimens of the thyreoid gland reminded him of those which he had seen in England, and did not look like those seen in New Zealand where local adenomata of the thyreoid were rare, where diffuse forms were common and where localized operation was not always possible. He stated that Dr. D'Ath was also of the opinion that the adenomata of the thyreoid seen in Sydney were quite different from the thyreoid enlargements seen in New Zealand. In an endemic place like New Zealand, they

were faced with the problem of what to do with these diffuse enlargements. Many of the patients lived without any malignant change or Graves's disease supervening. He was inclined to the opinion that in endemic adenomatosis, malignant degeneration was not a common event.

Dr. Poate in reply stated that in the surgery of the parotid gland, where the tumour was frankly malignant, the patient must be informed that facial paralysis was a necessary result of the operation. For many innocent tumours attack from the postero-inferior aspect was the most efficient one. In regard to the extreme rapidity of growth in some of these growths, he spoke of two which had simulated acute inflammation and which had been incised and drained. In regard to classification of the thyreoid enlargements, he did not intend to follow the American lead, but rather believed in the English classification. There was very definitely a form which appeared to conform to the Plummer type. He included the parotid in his paper merely because these tumours were so very obvious and were frequently referred to as simple. He emphasized the necessity for their early removal.

SECTION OF OBSTETRICS AND GYNÆCOLOGY.

Obstetrical Practice.

Dr. Henry Jellett (Dunedin), in his address as President of the Section of Obstetrics and Gynæcology, discussed the future of obstetrical practice. He said that the art of midwifery was characterized by three aims. The first was to bring a mother safely through a normal pregnancy, labour and puerperium. The second was to insure the delivery of a healthy infant and the third was to leave the mother in as normal a condition at the end of the puerperium as she had been at the beginning of pregnancy. There were three basic essentials on which the art was built. These were knowledge, skill and suitable environment. If these three essentials could be obtained, the risks of child birth would be reduced to their lowest. Dr. Jellett thought that they were obtainable, at any rate to a large extent. He went on to say that there were four cardinal factors controlling the maternal mortality rate. These were the nature of the midwifery attendant, the skill and knowledge possessed by that attendant, the degree of antenatal care and diagnosis which each woman received, and the environment during labour. While full recognition was given in theory to all four factors, in practice they were either erroneously interpreted or overlooked and the resulting mortality was similar to what it had been fifty years before. After giving a description of the procedure in an average midwifery case, Dr. Jellett went on to state that the chief essential in the management of normal pregnancy and in the prevention of abnormal pregnancy was antenatal care. The chief essentials in the management of normal labour were absence of haste and asepsis. The chief essential in the prevention of abnormal labour was antenatal diagnosis. The chief essentials in the treatment of abnormal labour were asepsis and operative facilities. These essentials were not observed in the average confinement. For this reason he held his view of the wrong interpretation of the cardinal factors controlling maternal mortality and he believed that the present system of caring for the puerperal woman was wrong. He quoted some statistics to show that the mortality in Holland and Scandinavian countries was lower than in the British Empire. Lower still were the figures from the Queen Victoria's Jubilee Institute. In the latter and in Holland and Scandinavia all patients with normal labour were attended by midwives only. Among the three types of attendant on puerperal women, the specialist, the general practitioner and the midwife, the general practitioner was the only one who could not avoid infection of different kinds. On the ground of freedom from sepsis alone the care of the normal parturient woman by the midwife was clearly indicated. As far as the medical attendant's skill and knowledge were concerned, Dr. Jellett gave detailed figures to show that the training of the medical attendant and of the midwife was more intensive in Holland than, for example, in Otago. After making reference to the importance of antenatal care, Dr. Jellett discussed the question of environment. The aseptic environment should be such that labour could be carried out with the same degree of asepsis as was a surgical operation. Although it might be suggested that it was absurd to worry about environment and to treat as pathological what was a physiological function, Dr. Jellett held that there was not one single incident in the management of normal labour which was not opposed in some manner to the physiological process of labour. This could be seen by comparing present day practice with what obtained among primitive peoples.

The remedies were to free the medical profession from the servitude of normal midwifery, to give the medical student sound and practical instruction, to teach the practitioner that his part in midwifery was antenatal care and diagnosis, the management of abnormal labour and abnormal puerperium and postnatal care, to teach him to preach the gospel of the necessity for early medical advice and for suitable environment and to reform private maternity hospitals.

Dame Janet Campbell (London) said that maternal mortality was a matter of great importance and much of the investigation done in Australia had been through the wisdom and generosity of medical practitioners. Maternal mortality was a subject of great importance to all branches of the medical profession. It brought the practitioner and the public health officer into close association. The Ministry of Health in its investigation into the question of maternal welfare had been greatly helped by the cooperation of the general practitioner. It was largely due to Sir Ewen Maclean that the British Medical Association had taken steps to bring this matter before the general public and had given the Ministry of Health very much assistance. Everyone envied the maternal mortality records of Scandinavia and Holland. She supposed that Dr. Jellett had experienced the same difficulty as she had experienced in obtaining comparable figures from other countries, especially in regard to puerperal sepsis. The classification of deaths varied in different countries. As regards antenatal supervision, everyone was agreed that it was one of the fundamental factors in reducing the maternal mortality rate. In England they had been trying to make this antenatal supervision more general than it had been in the past. All midwives kept a record of the antenatal condition of the prospective mother and if any abnormality were detected, a medical practitioner was consulted. Since the introduction of the scheme the general practitioner was becoming more interested in antenatal care. In England antenatal clinics had been established in large towns, any woman could apply for advice, but did not receive treatment. If any treatment were found necessary, she was referred to a hospital or a private practitioner. There were seven hundred such clinics. One difficulty they experienced was that of obtaining sufficient medical supervision of the right quality. The practitioner was sometimes a health officer and did not see the patient at the time of confinement. She thought that this was wrong, as the practitioner was out of touch with the patient. There was a tendency to look upon the antenatal clinics as a sort of half-way house. She hoped that eventually clinics would be formed as consultation clinics with a specialist in charge. The Queen Victoria Jubilee Institute did excellent work, but it must be remembered that to some extent the population treated was a selected one. They were patients from country districts. The majority of the nurses was not fully trained; many had only six months' training. They did district nursing if not engaged at the time at a confinement. The Ministry of Health hoped to have every midwife thoroughly trained, but the economic situation did not permit of this being done at once. One recommendation was that she should practise under supervision after her training and before taking up work by herself. She would like to see all midwives fully trained, but this was not possible as yet. In England it was contended that normal delivery was better conducted by midwives than by medical practitioners, but she was loath to adopt the methods as carried out in Scandinavia and Holland, where

the midwife was in complete control of the patient. A medical practitioner should have knowledge of the antenatal condition and should supervise puerperal treatment. In England they were considering the adoption of an insurance scheme whereby every pregnant woman would be entitled to the services of a midwife and a doctor. Sometimes patients could not afford both. In 1928 the Ministry of Health had appointed a committee of research and investigation to inquire into the cause of maternal mortality. The British Medical Association had helped the Ministry of Health very much in this direction. One difficulty was in regard to the confidential nature of the records, but the medical practitioner was assured that these records would on no account be divulged. The inquiry had been started in 1929, but already there was good material on which to conduct investigations. Dame Janet Campbell thought the medical profession had done a great deal for the solution of the problem of maternal mortality and morbidity, but she questioned whether it was doing all it could in every direction to lighten the burden of maternity. This must be solved by the medical profession.

Professor J. C. Windeyer (Sydney) said that there were so many and varied factors in maternal mortality that he hardly knew which to mention in the short time available. The blame for the persistence of a maternal mortality rate above the level regarded as irreducible, had been ascribed to everyone who had had anything to do with the pregnant, parturient or puerperal woman. He would restrict his remarks to some comments on the training of the obstetric nurse and the student. In Australia the course for nurses during the previous twenty years had been one of twelve months; for those who held a certificate in general nursing, it was six months. He condemned these periods as too short. In 1927, shortly after the appointment of the Nurses' Registration Board in New South Wales, at his instigation the board had approached the boards of all the other States with the proposal that the course of training of obstetric nurses should be lengthened. Not one of the boards had agreed. It would be impracticable to raise the standard in one State alone. He suggested to Dame Janet Campbell to recommend to the Federal authorities that the period of training throughout Australia should be increased. He wished to make it eighteen months and a nine months' course for those who held the certificate for general nursing. They had instituted a mothercraft department at the Royal Hospital for Women and other obstetric hospitals were following their example. He suggested that an additional two or three months should be provided for training in mothercraft. He held that both nurses and medical practitioners should receive instruction in the essentials of mothercraft in order to reduce the heavy neonatal mortality and morbidity. In New South Wales the proprietors of a hospital had to produce evidence that two hundred or more confinements were conducted in the institution each year before they could secure registration as a training school for obstetric nurses. This was necessary to give the trainees some experience of the treatment of the complications of pregnancy, labour and the puerperium. In regard to the training of medical students Professor Windeyer pointed out that throughout the English-speaking world the practical teaching of obstetrics had been increased and the subject was gradually securing a more reasonable share of the time allotted to clinical work. He was determined to make a real endeavour to prolong the period allotted to instruction in clinical obstetrics in the curriculum. At the University of Sydney, following on the theoretical lectures given to the fifth year students, the class was divided into two groups. Each received a short series of demonstrations on the anatomy, physiology and pathology of pregnancy, labour and the puerperium. Later in the year the group was further divided so that the class did not contain more than seven students. These small groups attended the main obstetric classes at the obstetric teaching hospitals. The nine weeks were divided into three periods of three weeks each. In the first period afternoon instruction in palpation, pelvimetry and vaginal examination was given. In the second period the student went into residence at the hospital and was kept closely engaged in acquiring knowledge and experience and making accurate observations. In the last period the student attended labours in the septic ward and the antenatal department and he received instruction in operative obstetrics. In the sixth year the student again went into residence at one of the obstetric hospitals for a two week refresher course. Professor Windeyer stated that it would be impossible to introduce teaching of obstetrics in the second and third years as was done at Utrecht without departing from the conditions laid down by the General Medical Council. He did not think that the early teaching of this subject would be advantageous.

Dr. Constance D'Arcy (Sydney) said there was great difficulty in getting women of a sufficiently high education to take up nursing. She suggested that it be compulsory for prospective nurses to have a high standard of education before being allowed to take up training. There was a tendency to lower the standard of general education necessary to enter the nursing profession. This should not be permitted. If nurses were to undertake the care of maternity patients, they should have a type of mind to coincide with their responsibilities. She thought nurses were underpaid in private practice; in many places they were treated like servants of the household. They could get much better salaries in other spheres of work which did not entail such strenuous training and so high a standard of efficiency. She thought there was a great demand amongst women for painless labour. The carrying out of methods of painless labour was not unattended with risk. When anæsthesia was given in a confinement, the labour ceased to be a normal one. She would finish by saying that a reduced morbidity at the Royal Hospital for Women had followed a reorganization and improvement of a general aseptic technique.

Dr. E. Sydney Morris (Sydney) thought that they should be careful in comparing statistics of different countries. Unless they were strictly comparable, anything could be proved, even the truth. The statistics of England and Wales were not comparable with those of Australia in general and New South Wales in particular. In England the old classification had been perpetuated, whereby deaths from puerperal nephritis and albuminuria were not included in puerperal mortality. If a pregnant or parturient woman died from pneumonia in England, the death would not necessarily be ascribed to puerperal causes, whereas in Australia it would be so classified. In the publication of the investigation into maternal mortality in Aberdeen it had been shown that an additional 15% of the total maternal deaths should be added to the recorded statistics. He asked if Dr. Jellett could state whether the same classification was employed in Holland and Scandinavia as in Australia and whether deaths from abortion, illegal operations and septicæmia following abortion were included. They should remember that the figures given from the Queen Victoria Jubilee Institute were based largely on normal full-time labours and did not represent the conditions obtaining throughout the country. Australian statistics included all events during pregnancy, parturition and the first month of lactation. The importance of abortion as a cause of mortality could not be exaggerated. Criminal interference was certainly on the increase. Illegal operations alone provided from 10% to 14% of the total mortality in New South Wales and at the Coast Hospital about seven hundred patients were admitted annually for treatment of abortion. Dr. Jellett had spoken of the necessity of eliminating haste and sepsis. Everyone would approve of this. As a result of his investigations he had come to the conclusion that maternal deaths were frequent in congested areas in which confinement appeared to be managed more or less on the run. While there was room for improvement in the education of medical students, Dr. Morris thought that the fault lay in the failure to apply principles. He attributed this to indifference, professional and lay, regarding the necessity for scrupulous attention to detail. Neglect did not always exact due retribution. He held that deaths from eclampsia which accounted for between one-fifth and one-fourth of the

total deaths, could be reduced to negligible proportions, if medical practitioners were insistent on the application of principles. He held that the tolerance of the visiting nurse was evidence of indifference on the part of the medical profession and of the public. The second reason was the tendency to regard childbirth as a physiological function and therefore of minor importance. The public measured the practitioner's competence by his ability to extract the child dead or alive without consideration being given to the condition of the mother. Antenatal care would eliminate many of the factors, but education of the public was an uphill fight. Dr. Morris disapproved of private hospitals being registered for medical and surgical treatment as well as for obstetric purposes. He suggested that this was not a serious matter, since when a septic infection occurred, the hospital was closed and the nurse suspended from practice for some weeks. He thought that the complaint of the nurse who claimed that she wore gloves, was careful in regard to asepsis and had made no examinations and yet was suspended, while the doctor made several examinations without careful sterilization and was not suspended, was significant. In New South Wales out of 3,246 midwifery nurses registered, only one hundred and fifty were not hospital trained nurses. All of these untrained nurses had been vouched for as being strictly reliable by at least two medical practitioners. He asked Dr. Jellett whether the Dutch training covered all the aspects of obstetric practice.

Sir Ewen Maclean (Cardiff) said he felt sure that Dr. Jellett would be disappointed if the debate that day did not confer finality on this problem, though it might be a long time before a real working solution is arrived at. In Holland and at the Queen Victoria Institute where the maternal mortality figures were low, all the patients were confined by midwives. Dr. Jellett no doubt had other proposals to make and would not advocate this method for general adoption. The environment of the general practitioner was often conducive to slackness. Dame Janet Campbell was right when she said that there was a great deal to do in the way of propaganda directed towards the mother. He felt that the specialist was by no means blameless in regard to instrumental interference. He recalled a confinement he had attended. When he arrived at the house, not only did the husband and other members of the household ask him to hasten delivery, but the whole street demanded instrumental interference. He thought that antenatal work was an important factor which would reduce maternal mortality. Another factor to be considered in the reduction of the mortality rate was the question of environment. This was to a great extent dependent upon the housing problem, which was a very difficult one. It would be long before better conditions were obtainable. Enlightenment of the public was the greatest factor to be considered in the future. The general practitioner must get adequate remuneration for his work. It was by a scheme of insurance that real benefit would accrue, though he did not suggest that such a scheme should be adopted in Australia.

Dr. J. H. L. Cumpston (Canberra) said that he wished to emphasize three points. He regretted that the medical profession was not more closely associated with child welfare work. He recommended no haste in coming to final conclusions in this matter of maternal mortality and the methods to combat it. Dame Janet Campbell had been invited by the Government to investigate the question of maternal mortality and he would ask that the medical profession hold themselves ready to discuss every aspect of this question.

Sir Truby King (Wellington, New Zealand) said that he would like to touch upon the head injury to the child in childbirth. His work brought him into close contact with many children suffering from cranial birth injuries. He regretted that New Zealand occupied such an unenviable position in this regard. The infant mortality rate in the first month of life was excessive, but over one month and from then onwards the infant mortality rate was low. He had sent a medical man and a nursing sister to Holland to carry out investigations and their report had confirmed the opinion which Dr. Jellett had expressed in his excellent address. He was deeply impressed by the logic of Dr. Jellett's suggestions and he most heartily approved of them.

Dr. Mary de Garis (Geelong) said that the patients looked for anæsthesia during labour and she thought that the patients would avoid midwives unless they could get chloroform. This question of maternal mortality assumed different aspects in each country. In Glasgow rickets was very common among the population and this affected the maternal mortality rate. She thought that very few practitioners interfered unnecessarily in labour. Dental sepsis was a great factor predisposing to maternal mortality.

Dr. W. R. Tomlinson (Sydney) expressed the opinion that the maternal mortality rate could be reduced if help were made available for unmarried mothers. It would be a retrograde step to hand over normal confinements to midwives.

Dr. E. Ludowici (Sydney) said that some of the speakers had enunciated a policy for adoption, although they did not concern themselves actually in the practice of midwifery. Dr. Jellett had suggested the elimination of the medical man in the conduction of normal confinements. He would suggest that the patient be eliminated also. By this he meant that patients who were not physically able to go through a confinement, should be sterilized. There were many women going through pregnancy after pregnancy who were not fitted to stand this strain. Elimination of these patients would result in a decrease in the maternal mortality rate.

Dr. Jellett, in reply, said that he would confine his reply to three specific points, the accuracy of statistics, the position of the practitioner and anæsthesia. The accuracy of the Dutch statistics had been questioned by some of the speakers on the grounds that they were not strictly comparable with British statistics. The statistics of the Queen Victoria Jubilee Institute had been similarly questioned on the ground that their patients belonged to one type of the community. In regard to Holland the figures he had given had been supported by the personal investigations of Sir Truby King. The statistics of the Queen Victoria Jubilee Institute of 1·6 per thousand births included associated diseases which were excluded from official statistics, therefore, even if in certain respects they were not strictly comparable with the latter, in other respects they erred on the excess side. Furthermore, that both statements and statistics were in nowise impossible was clearly shown by the statistics given in the Aberdeen report which revealed a mortality of somewhat over two per thousand in the practice of midwives and of somewhat over six per thousand in the practice of medical practitioners. Some of the speakers who had discussed his views on the position of the general practitioner in midwifery practice, had used the word elimination. His proposals made no such suggestion. What he wanted was to improve the position of the practitioner, to relieve him of the servitude which was unnecessary, and to focus his attention on the essentials of antenatal treatment and diagnosis, the treatment of complications and postnatal care. Throughout pregnancy and labour the patient should be under his care, but during labour his suggestion was to delegate the care of the normal patient to the midwife. Again other speakers had urged that, if women were attended by midwives, they would lose the relief given by anæsthesia. This was not so. In the New Zealand St. Helens Hospitals he had some years before sanctioned the introduction of the obstetrical degree of anæsthesia by midwives provided that Murphy's inhaler was used and that the patient had been under previous medical care. Further, midwives in New Zealand were taught how to use the appliance. Under such conditions he saw no reason whatever why midwives should not induce obstetrical anæsthesia; his proposals were in nowise complicated by the imagined loss of its benefits.

Morbid Anatomy of Uterine Prolapse.

Dr. Robert Fowler (Melbourne), in a paper on the morbid anatomy of uterine prolapse, said that the descent of the uterus was but one feature of a composite disloca-

tion. Portions of the genital tract not infrequently became prolapsed without coincident displacement of the uterus. It was thus necessary to consider all forms of genital prolapse in one comprehensive classification. Fothergill's classification was suitable. There were four conditions and three combinations of them. The four conditions were cystocele, true prolapse which might occur in three stages, a long cervix with a loose uterus and rectocele. The three combinations of these were rectocele and cystocele, rectocele and true prolapse and rectocele and long cervix. After describing the clinical features of the four types of prolapse, Dr. Fowler said that in every variety of genital prolapse some portion of the vagina participated. Primary prolapse conditions might be divided into those originating from the anterior and those originating from the posterior vaginal structures. This provided the key to anatomy, pathology and treatment. Dislocation of the anterior vaginal wall and the urinary bladder invariably accompanied uterine prolapse.[1] These structures were supported by the fascial shelf that was strung across the pelvis in the plane of the vagina. This shelf slung the vagina and the uterus by its peripheral attachments to the fixed encircling wall of the pelvic girdle. The essential and only constant lesion in uterine prolapse was a relaxation of the tissues in some or all of the regions of the pelvic shelf. Normally this pelvic cellular tissue contained ample smooth muscle and elastic fibrous tissue. Loss, absence, atrophy, fatty change of muscle fibres, stretching of the parametrium converted it into two elongated fibrous ribbons. The attenuation and dislocation of the pelvic floor in *procidentia* together with the expansion of its genital hiatus had been admirably demonstrated by F. A. Maguire. Unfortunately he had left a wrong impression when he had stated that the pelvic floor was opened and the viscera fell through the gap. In reality the distension of the pelvic floor was secondary to the prolapse or falling of the viscera. Maguire's neuro-vascular bundles were the same as what Dr. Fowler called the pelvic shelf. The improvement that took place in gross prolapse after prolonged rest in bed and the application of glycerin tampons to the vagina, supported the view that physiological tonus was a property of the pelvic shelf. Dr. Fowler then discussed the complication of uterine prolapse. He divided them into genital and urinary varieties. The former were adequately discussed in text books. He had come to the conclusion that the urinary disability of patients with extensive prolapse was comparable to that occurring in prostatic enlargement. He discussed the cystoscopic and pyelographic findings. It behoved surgeons to ascertain the efficiency of the renal secretion prior to undertaking surgical operation.

Dr. R. H. Morrison (Melbourne) read a paper in which he discussed the prophylaxis and treatment of uterine prolapse. He considered the prophylaxis, the points of view of pregnancy, labour, the puerperium and uncomplicated retrodisplacement. He described the measures which should be undertaken in each of these stages on the first manifestation of prolapse. He divided the treatment into non-operative and operative varieties. He emphasized the necessity of determining that the prolapse was the cause of the patient's symptoms. In regard to the operative treatment he referred to Fothergill's operation as that most favoured and discussed vaginal hysterectomy, interposition and perineorrhaphy.

Dr. F. A. Maguire (Sydney) congratulated Dr. Fowler on his paper. He was in accord with the general principles he had defined. Dr. Fowler had, however, taken one line from his article on *prolapsus uteri* and had stated that when the *levatores ani* fell apart, the viscera fell out through the gap. It reminded him of the old saying: "O that mine enemy would write a book!" For when they expressed their opinions in writing, they were liable to have portions of them lifted from their context and misquoted against them. He wished to point out that in the previous paragraphs he had stated that all the supports of the uterus had been greatly lengthened and stretched. Further the reference to a book written by the speaker, entitled: "The Anatomy of the Female Pelvis," showed that he described the supports of the uterus as consisting of direct and indirect supports. The direct supports were the round ligaments, the broad ligaments, the utero-sacral ligaments and the neurovascular bundles. The indirect supports were the *levatores ani*. Dr. Fowler had referred to the pelvic shelf. The term pelvic shelf embraced many structures. From an anatomical point of view, he would prefer to regard them as separate structures and to use for each a name which indicated the origin or the purpose of the structure. It was only when the direct supports of the uterus were stretched or damaged that the pelvic viscera could "fall through" the gap made by stretching or the damaging of the *levatores ani*.

Dr. T. G. Wilson (Adelaide) said he would like to raise only two points in regard to treatment. The first was in reference to those cases, especially in young women who complained of bearing down and possibly of something coming down in the passage, soon after the confinement. Dr. Fowler had mentioned that by tampon treatment complete prolapse often receded to a large extent. Prolapse of the type mentioned could also be remedied and it was in these patients that operations should be avoided if possible. By voluntary exercise of the perineal muscles the perineum received its tone and after some time the patient lost the sensation of bearing down. This exercise Professor Wood Jones used to describe to his students as the "perineal shrug" and it seemed a very apt description. The finger was inserted in the vagina and the patient was induced to contract down on it. She soon realized what was required of her and such exercises were carried out for ten minutes night and morning for a few weeks. The patient would often find that she had lost the sensation of bearing down and the question of any necessity for an operation disappeared. The second point he wished to bring up was in reference to the operative treatment of complete or nearly complete prolapse. His own practice had been, after amputating the cervix, to detach the lateral ligaments partially from each side of the cervix and isthmus and after freeing them as much as necessary to fix them by crossing them over the front of the cervix, the left ligament to the right side of the cervix and *vice versa*. It was simply a method of shortening the ligaments a little more than was possible by the ordinary method. It was easily done if the needle with ligature attaching the ligament on one side was inserted and not tied till after the other side was fixed. This shortening of the lateral ligaments in front of the cervix brought the cervix backwards and tended to keep the fundus forward. Apart from pelvic complications he had not found it necessary to open the abdomen.

Dr. J. J. Holland (Perth) emphasized the great value of rest for at least a week, preferably a month, before any operative treatment was attempted. Furthermore, rest alone might delay an operation for as much as two years in young women. He advised the treatment of the affected cervix first and allowed one or two weeks to elapse before the vaginal walls were repaired.

Dr. H. C. E. Donovan (Sydney) said that in the prevention of prolapse of the uterus an important factor was the avoidance of any action that forced the uterus downward. This was likely to be caused by the rough and improper use of the Dublin method of delivery of the placenta, by pulling on the breech or by premature application of forceps. In the former he had seen the uterus forced down until the cervix presented at the vaginal orifice. In the second the dragging on the aftercoming head through the insufficiently dilated cervix had a similar result in overstretching or rupturing the ligaments attached to the cervix and bladder. The result was invagination of the vaginal vault and cystocele. This descent of the uterus by invagination of the upper part of the vagina could occur only if the cervico-pubic, utero-sacral and basal portion of the broad ligaments were damaged. The morbid anatomy was very different from the results of tearing and stretching of the muscles of the pelvic floor caused by the passage of the head. Such damage resulted in a relaxed vaginal orifice and rectocele. The symptoms caused by these lesions were far less crippling than damage to the

[1] Dr. Fowler showed a cinematograph film which had been prepared by Dr. A. J. Trinca. In the film were portrayed the genesis of all forms of genital prolapse.

ligaments surrounding the cervix unless the *sphincter ani* was involved.

In most cases of prolapse an efficient operation on the anterior vaginal wall and the supports of the bladder with amputation of the cervix and colpo-perineorrhaphy was all that was necessary. This did not take up the slack in the upper part of the vagina, but if the operation left the uterus well anteverted and the pelvic floor appeared to be firm, recurrence was unlikely. When the upper vaginal invagination was very pronounced and the uterus did not take up a position of anteversion as a result of the plastic operation, it became necessary to take up this slack. This was sometimes done by operation directed at the cardinal ligaments, but he considered that this was unjustifiably extensive, as it involved a dissection nearly as great as that involved in Wertheim's operation. There remained the much abused operation of ventrosuspension or ventrofixation. They had been subjected to much criticism, often without a real knowledge of the method or of its effects. These operations secured simply and with the minimum if risk what could otherwise be done only by a dangerous and difficult dissection. They had been performed at the Hospital for Women for several years, both for prolapse and for retroversion. They had not heard of a single patient who had had dystocia as a result. He would be pleased to hear from anyone who had encountered dystocia caused by it. He was sure that many of the critics were not familiar with the proper technique and confused it with the original ventrofixation which fixed the posterior portion of the fundus to the abdominal wall and even scarified it to obtain a firm fixation. The proper point to suture was immediately above the internal *os*. This was sutured by two or three stitches to the abdominal wall. The exact spot on the abdominal wall required some experience to determine, but it should not cause tension nor unduly cramp the bladder. An important point in after treatment was catheterization at hourly intervals of six hours. When attached at this level on the uterus practically the entire increase of size caused by pregnancy took place above the artificial ligament produced and sacculation and dystocia did not occur. He maintained that ventrosuspension or fixation was necessary and certainly did not cause trouble at future pregnancies. He had given up the use of pessaries and in old women and others unsuitable for operation he used a pad of cotton wool smeared in glycerin to fill the vagina, retained in place by a diaper. This was very comfortable and efficient and the patient soon learned the most suitable size for the pad.

Dr. H. Leighton Kesteven (Bulladelah) stated that in his opinion the operation of cervical repair in women of child-bearing age was not justifiable. He was of the opinion that they always became worse after subsequent confinements. The operation left a cervix hardened and non-dilatable on account of the formation of fibrous tissue. He thought that the operation was performed too frequently. He denied that manual dilatation of the cervix in labour was responsible for tears. This procedure when carried out was usually hurried. Normally, dilatation was a slow process, but as sometimes performed the time limit of the procedure was the time limit of the muscular power of the operator. If manual dilatation were done patiently, the cervix would not tear. He had done it frequently without any damage to the cervix. This procedure should take at least forty-five minutes. One point he would like to discuss in Dr. Morrison's paper was in reference to the recurrence of retroversion following pregnancy. He was of the opinion that pregnancy rejuvenated the tissues and did not cause recurrence of retroversion.

Dr. B. Milne Sutherland (Melbourne) stated that in his opinion prolapse following confinement was caused by overstretching of the pelvic shelf. This was caused by the premature use of forceps. Much overstretching and perineal laceration could be prevented by vaginal and perineal massage. Students were taught that no manipulation of the vagina and perineum should take place, but he affirmed that vaginal and perineal massage was of great help in prevention of overstretching of the pelvic floor and perineal rupture. He was opposed to episiotomy as a general rule. It was impossible to know when the perineum would be ruptured and it was not a wise thing to anticipate by performing a prophylactic procedure. He agreed that suturing of the ruptured perineum should be performed at once. He did the same type of suturing as in the usual operation of perineoplasty. He knew of a number of patients who had gone through confinements after having undergone operation for correction of misplacements and who had had no recurrence. In regard to the examination of patients in the puerperal period it was necessary to consider their feelings; some object to this procedure. He had seen two patients with dystocia appearing after amputation of the cervix.

Dr. H. A. Ridler (Sydney) asked Dr. Morrison whether he used plain or chromicized gut in doing Fothergill's operation; he also asked for information concerning the quantity and size of the gut used.

Dr. C. C. Coghlan (Sydney) said that congenital prolapse occurred. Predisposing causes were *spina bifida* and anterior poliomyelitis. These patients were better left alone. Congenital retroversion occurred in 26% of normal *nulligravidæ;* it could almost be looked upon as a normal condition and was usually symptomless. The patients should be left alone. It was different in *multiparæ*. Retroversion in *multiparæ* was a predisposing cause to prolapse. He quoted two series each of fifty cases of puerperal retroversion in which the uterus had been maintained in anteverted position by a round pessary. In one series the uterus had been restored to the anterior position in every patient after two or three weeks; in the other series only four unsuccessful results had been recorded. If a puerperal retroversion were treated in the first three or four weeks, it could be cured by non-operative means. Early prolapse could be cured by repair of the pelvic floor. He sutured the cervico-pelvic ligament to the anterior wall of the uterus above the level of the internal *os*. No extensive vaginal operation should be performed during the child-bearing period, as the condition of the patient became worse after confinement.

Dr. A. Norman McArthur (Melbourne) wished to point out that the perineum was not directly a support to the uterus. He had frequently demonstrated to students a uterus in normal position and a perineum torn almost to the third degree. Anterior colporrhaphy was done with such care that the vesico-vaginal fascia should be brought together including or excluding the mucous membrane. The bladder should always be pushed up from the cervix and anchored there by a suture, including vaginal mucous membrane, portions of cardinal ligaments and the anterior wall of the cervix. This was just as Fothergill advocated. In his own work, however, he believed in a very extensive colpo-perineorrhaphy. The upper reaches of the vagina were concertina-like, sagging and loose. This slack portion of the vagina was removed from the cervix to the posterior vaginal orifice. By this extensive combined method the uterus was thrown into the anterior position. He wished to emphasize that after Fothergill's method of performing anterior colporrhaphy this extensive colpo-perineorrhaphy was sufficient to cure the great majority of patients with *prolapsus uteri* without any abdominal operative intereference. He showed a cinema film demonstrating his method of operating.

Dr. H. Jellett (Christchurch) supported the readers of the papers in almost every detail; it was not possible to define operations for prolapse. Each case should be treated on its merits. He had introduced the operation of vaginal shortening of the utero-sacral ligaments. There were four essentials in any operation for *prolapsus uteri*: to reduce the cervix to a suitable size where necessary, to bring it to a suitable level, to put it in the anterior position and to perform any necessary plastic repairs. He shortened the utero-sacral ligaments where they were elongated and regarded it as a very necessary procedure. In patients past the child-bearing period Wertheim's interposition operation was an excellent one. It maintained the uterus well in the anterior position, prevented cystocele and took up the vaginal wall. At times it was necessary to associate it with shortening of the utero-sacral ligaments and to excise a portion of the uterine wall if the uterus were enlarged. During the child-bearing period he preferred

the Alexander operation, but occasionally he performed ventro-suspension. Any operation such as shortening the round ligaments, when done by itself, would be a failure. He had seen prolapse follow supravaginal hysterectomy when the cervix had been sutured to the lower and anterior portion of the abdominal wall. The ring pessary was not suitable for backward displacement in the puerperal period. The Hodge pessary should be used and moulded for each patient and all retro-displacements in the puerperal period should be treated.

Dr. Fowler in reply stated that he was glad that Dr. Maguire had cleared up some points on which he had criticized him, as he considered Dr. Maguire the leading authority in Australia of the morbid anatomy of prolapse. He agreed with the suggestion in regard to the method of palliative treatment before prolapse operations. The most important point in operative correction of prolapse was the shortening of the ligaments comprising the pelvic shelf. Operations on other ligaments were of secondary importance.

Dr. Morrison in reply said that he thought it wise to give patients with prolapse rest before operation. He knew of four in whom ventrosuspension had caused dystocia. Three had died. All of them had posterior misplacement of the uterus. Patients should be warned that retroversion and prolapse might recur after pregnancy. He always used chromicized gut for Fothergill's operation. He sometimes used fine Pagenstecher thread to take up tension on the chromicized sutures.

Ante Partum Hæmorrhage.

Dr. E. Brettingham Moore (Hobart) discussed the question of *ante partum* hæmorrhage. He divided it into two varieties: accidental hæmorrhage and unavoidable hæmorrhage from a placenta which had encroached on the lower uterine segment. In regard to the ætiology of accidental hæmorrhage experimental observations by F. J. Brown indicated that chronic nephritis was a necessary antecedent. Further, from the injection of uranium nitrate and *Bacillus pyocyaneus* it appeared that a slow process affecting the vessels of the placental site was set up in patients with chronic nephritis and an acute exacerabtion was all that was necessary for the production of accidental hæmorrhage. In regard to the toxæmic theory it was difficult to prove how far a true toxæmia was responsible and how a deficiency disease was operative. Accidental hæmorrhage occurred at a time when the maternal tissues were undergoing and for a long time had undergone an increasing demand for calcium and phosphorus. The picture described by Corlette of the condition of animals suffering from calcium deficiency suggested eclampsia in human subjects. Dr. Brettingham Moore described the microscopical appearances associated with accidental hæmorrhage and referred to the description by Couvelaire of a utero-placental apoplexy. He thought that the condition could not be ascribed solely to the hydraulic pressure exerted by the uterus, but that a changed condition of the uterine walls must be partly responsible. After having referred to diagnosis Dr. Brettingham Moore discussed the treatment. It was often sufficient to aid and accelerate delivery. If there were reason to suspect damage and infiltration of the uterine wall, abdominal section was indicated. Cæsarean section would sometimes have to be succeeded by amputation of the uterus.

In the consideration of unavoidable hæmorrhage or *placenta prævia* certain anatomical peculiarities had to be remembered. These included the fact that the muscle fibres of the lower uterine segment were less firmly held together than the fibres of the body and that the uterine wall in this portion was less thick than in the body of the uterus. The placenta became flattened and spread out over a larger area than usual. After reference to Hofbauer's theory and the gravitation theory, Dr. Brettingham Moore said that a history of endometritis and multiparity were prominent features. As far as treatment was concerned, the patient should be watched in a suitable environment. If bleeding continued and the pulse rate increased and remained over 100 a minute, there should be no more delay. The membranes should be ruptured whether labour had started or not. In most instances this was sufficient to check the bleeding. If not, a Champetier de Ribes's bag should be introduced; this acted as a plug, as a dilator of the cervix and as a stimulant for uterine contraction. If a de Ribes's bag was not available, the method of Braxton Hicks should be used.

Post Partum Hæmorrhage.

Dr. J. A. Cameron (Ipswich) read a paper on the subject of *post partum* hæmorrhage. He said that it was frequently stated in text books that severe *post partum* hæmorrhage was generally the fault of the medical attendant. Dr. Kesteven had recently stated that in a series of 768 forceps deliveries he had not experienced a single instance of *post partum* hæmorrhage. These two statements had influenced Dr. Cameron in undertaking to write the paper. He confessed that he had had many cases of this type of bleeding in his practice. He found that one patient in every eighty-two whom he confined, lost blood severely enough to cause considerable anxiety. In more than half of this number medical aid had not been obtained until dangerous bleeding had taken place. It was reasonable to suppose that many of these hæmorrhages could have been prevented under medical supervision. His figures approximated closely to those from the Rotunda Hospital. Among the predisposing causes debility from preexisting disease had to be considered. The septic conditions were the most important of these, but acute illness did not necessarily predispose to bleeding. Only two of 138 of his patients with severe albuminuria had had hæmorrhage which was at all copious. Among the causes arising during labour were *ante partum* hæmorrhage, prolonged anæsthesia, any condition which prolonged labour, and two causes operating in the third stage. One of these was non-emptying of the uterus and the other was exhaustion of the uterine muscle. As far as prevention was concerned, the predisposing causes could be obviated by adequate antenatal supervision and the causes operating during labour called for the proper conduct of the first and second stages. Treatment of severe bleeding in the third stage consisted in inducing Nature's method of contraction and retraction. Treatment had to be directed to immediate arrest of the bleeding, maintenance of that arrest and permanent closure of the bleeding vessels. Dr. Cameron referred in turn to the importance of repair of lacerations, removal of the retained placenta, the promotion of retraction of the uterus, the raising of the foot of the bed, the use of pituitary extract and of restorative measures.

Professor J. C. Windeyer (Sydney) thanked the speakers for their excellent papers. Dr. Brettingham-Moore had mentioned that a large number of *ante partum* hæmorrhages was due to toxæmia of pregnancy. Dr. B. T. Mayes, a Sydney graduate, was working in London under Professor Browne, investigating the toxæmias of pregnancy. He considered that for some patients with concealed accidental hæmorrhage Cæsarean section might be necessary, but for milder forms sedative treatment sufficed. He used morphine. He disagreed with Dr. Brettingham-Moore in regard to the rupture of the membranes in accidental hæmorrhage. It was best to leave the membranes unruptured. Those who advised rupture of the membranes, maintained that it led to contraction of the uterus on to the fœtal body, but he always preferred to keep the membranes intact. It was necessary to rupture the membrane only when performing some intrauterine manipulation. He emphasized the fact that in *placenta prævia* there was frequently a large placenta. In *ante partum* hæmorrhage it was necessary to prepare for the control of the hæmorrhage before the obstetrician started his examination. Sometimes the methods used for the diagnosis of *placenta prævia* caused hæmorrhage such as the insertion of the finger through the *os uteri*. For the purpose of preventing blood loss external version could be performed before the membranes were ruptured and a leg could be brought down. Another method that Dr. Brettingham-Moore had not mentioned in the treatment of *placenta prævia*, was scalp traction by means of suitable forceps applied to the fœtal scalp. He had used it on several occasions and it had always given good results. The type of hæmorrhage in

placenta prævia was usually a low pressure venous and not an arterial hæmorrhage. He regretted that owing to the limited time allowed him for discussion he was unable to discuss Dr. Cameron's paper.

Dr. J. B. Dawson (Adelaide) expressed disagreement with the statement that hysterectomy was necessarily called for in those grave forms of accidental hæmorrhage to which the name of apoplexy of the uterus had been given; he had seen several patients in whom after evacuation by Cæsarean section, the uterine muscle in spite of its enlarged condition had been capable of preventing any *post partum* bleeding of consequence. The implantation of the fertilized ovum was a very active process depending upon the invasive property of the trophoblastic epithelium. The exact site of implantation probably depended upon the point in the genital tract at which the ovum met the spermatozoon. If this was relatively late in the career of the liberated ovum and occurred in the vicinity of the uterine cornua, the ovum probably migrated to the lower segment of the uterus before the trophoblast was sufficiently developed to insure implantation. Dr. Dawson wished to emphasize the point that for the treatment of central *placenta prævia* in patients who had not been subjected to much vaginal investigation, the operation of Cæsarean section stood alone. It obviated a distressing vista of obstetrical complications including tearing through the placental tissue, greatly increased hæmorrhage, severe cervical lacerations, infection and a dead child. He disagreed with Potter's statement that 60% of vertex presentations were in the posterior position at term. His own experience of 624 ante-natal examinations, during the previous eighteen months, revealed that only 14% occipito-posterior presentations existed within fourteen days of term. Regarding *post partum* hæmorrhage he thought that this was often due to overanxiety to empty the uterus. In view of the exhausted condition of the uterus at the end of the second stage, this led to premature efforts of uterine massage and compression before the muscles had had the rest necessary to insure that adequate retraction would be maintained.

Dr. James C. Hughes (Sydney) stated that his experience concerning the commoner variety of *post partum* hæmorrhage coincided with that of Dr. Cameron. He had rarely met with the sudden or alarming variety of hæmorrhage described in text books. Much more frequently he had encountered that type characterized by the frequently recurring loss of a small amount of blood from the vagina after the completion of the second stage. This blood in nearly every instance came from the uterus. Although it could be stopped temporarily by the judicious stimulation of a flabby uterus, it soon recurred and the patient passed into a critical condition. The practitioner then regretted that he had not adopted manual removal of the placenta even as long as ten minutes or more previously. In regard to manual removal he confessed that after twenty years' experience of general practice he still dreaded doing it. At times it would have been more advantageous to the patient had he done it sooner. Packing of the uterus was a very efficacious method for arresting hæmorrhage after delivery of placenta, when the usual methods had failed. It was easy to do and did not require a great amount of packing.

Dr. H. A. Ridler (Sydney) quoted a series of 221 cases of *placenta prævia* extending over a period of fifteen consecutive years. The maternal mortality was 7·5%. Of these deaths over 50% were due to central *placenta prævia*. Over the same period there were 152 cases of accidental hæmorrhage with a death rate of 7·75%. He agreed with Dr. Cameron that manual removal was not a dangerous operation, the danger was caused by the portion of placenta that was left behind.

Dr. H. C. E. Donovan (Sydney) said that the results of treatment of *placenta prævia* were quite satisfactory as far as the woman was concerned, but the fœtal mortality was very high. There appeared to be great difficulty in achieving any improvement in the still-birth and neonatal death rate. In a consecutive series of 10,716 births at the Women's Hospital up to the end of 1928 there were 105 cases of *placenta prævia* with three deaths. Thirty-eight of these cases occurred in *primiparæ* and sixty-seven in *multiparæ*. The fœtal mortality revealed in forty records examined was nearly 40%. The treatment varied. Cæsarean section had been performed a very few times; external or bipolar version with the bringing down of a leg had been carried out frequently, while some patients had been delivered by forceps with or without preliminary plugging. Champetier de Ribes's bag had been used occasionally. He did not use it because it tended to detach the placenta further and because blood could be concealed behind it in quantity. The high still-birth rate and loss of life of infants was very largely the result of prematurity; to this extent it would appear to be largely unavoidable. The inevitable separation of the placenta and consequent asphyxia of the child were further factors detrimental to the child that were difficult to combat. The ideal treatment varied with the surroundings of the patient, the facilities for operative treatment, the term of gestation, the amount of hæmorrhage, the amount of interference that had taken place and the desire of the parents for a living child. In lateral *placenta prævia*, if the pains were strong and the patient were a *multipara*, forceps extraction or retention of the head by a tenaculum applied to the scalp might be all that was required. If the child was near term and was alive, if there had been a minimum of examination, if the placenta was central or marginal and if there had been little loss of blood or detachment of placenta, Cæsarean section had to be considered. The husband should be consulted and the position explained to him. If there were no children and especially if the woman was over thirty-five, these facts should weigh in favour of section. It was a calamity to perform Cæsarean section and extract a premature child with little chance of survival and a tragedy to present a dead baby to the parents. In practice Cæsarean section was indicated in only a small number of patients. The great majority of patients had to be treated in a manner midway between the two methods indicated. If there were no facilities for hospital treatment and the child was premature, the safest line of treatment was external, not bipolar version and the bringing down of a leg. This required a dilatation sufficient to admit two fingers through the cervix. Should this degree of dilatation not be present, the vagina should be firmly plugged with swabs. This method never failed to produce the necessary dilatation in six hours. He agreed with Professor Windeyer that the membranes should not be ruptured until it was decided to bring down a foot. Accidental hæmorrhage was less common than *placenta prævia* and was almost entirely confined to *multiparæ*. In the same series of 10,716 patients accidental hæmorrhage occurred forty-four times, forty-one times in *multiparæ*. There had been only one maternal death in spite of the fact that in the majority the condition was complicated by albuminuria. The treatment adopted was plugging according to the Dublin method and dieting; purging was employed for the albuminuria, if present. In two cases of severe concealed hæmorrhage, Cæsarean section with hysterectomy was performed with one death. The patient who had died, was moribund on admission; operation was under local anæsthesia and the uterine muscle was infiltrated and the peritoneal cavity invaded by the blood. In this same series there were 277 cases of *post partum* hæmorrhage, ninety in *primiparæ* and 187 in *multiparæ*. There were four deaths. In some hæmorrhage was very mild and the treatment used varied from massage of the fundus and pituitary and ergot to bimanual compression of the uterus. This never failed to stop the hæmorrhage at least for the time until uterine douches were made ready. A second pair of sterile gloves should always be available. Packing of the uterus was not undertaken. He failed to understand how this could be of any value as it would require large quantities of material, consume much time and cause great shock in the cases of uterine atony for which it was recommended. Atonic *post partum* hæmorrhage was certainly preventible and was caused by improper conduct of the third stage. Traumatic hæmorrhage could always be controlled by suturing the vagina and perineum and by hot vaginal douches. He had not been compelled to suture the cervix.

He had seen patients in consultation when the cervix had been torn high into a fornix with persistent hæmorrhage; he used a hot vaginal douche and plugged the tear with gauze. For the acute anæmia following either *ante partum* or *post partum* hæmorrhage the replacement of fluid was the crying need. Transfusion of blood was the ideal treatment, but required time; gum solution was more readily available and it was a valuable substitution. Saline solution or water was valuable by the mouth, the rectum and hypodermically in that order. He had found intravenous injections of saline solution of very doubtful value.

Dr. B. Milne Sutherland (Melbourne) said he would like to mention one point that had been raised by Dr. Cameron concerning the type of hæmorrhage due to partial separation of the placenta. This type of hæmorrhage had troubled him in his early days in practice, and it still troubled the younger men. It was a slow hæmorrhage accompanied by contraction and deficiency of retraction. It persisted for a long period until the practitioner realized that the patient was suffering from a severe loss of blood. He wished to emphasize that once this hæmorrhage occurred, the placenta did not separate completely of its own accord. The only treatment was manual removal of the placenta. This type of hæmorrhage and its treatment were not sufficiently emphasized in the text books and in the teaching of students. Manual removal of the placenta was not so dangerous a procedure as some people supposed. He affirmed that early interference lessened the blood loss and thus did not diminish the patient's resistance.

Dr. Mary de Garis (Geelong) said there was one variety of hæmorrhage which was sometimes serious; it was due to laceration of the vestibule. She had never seen serious *post partum* hæmorrhage in her private work. She gave intrauterine douche to 3% of her patients. She emphasized the fact that patients were apt to suffer from the same type of hæmorrhage in each confinement. She had never performed manual removal of the placenta in her private practice, but in other work she had found that removal of the retained clots by hand and douching had stopped the hæmorrhage.

Dr. H. Jellett (Christchurch) thanked the readers for their excellent papers. He thought that concealed accidental hæmorrhage was one of the most fatal conditions which could arise in pregnancy or labour. Fortunately it was also one of the rarest. In 37,000 cases at the Rotunda Hospital during the time that he had been associated with the hospital, he had seen it only about half a dozen times. He did not think that Cæsarean section was often indicated. Conservative treatment usually sufficed when the hæmorrhage was not severe. He had had success with pituitrin and morphine. He did not think that external accidental hæmorrhage was always toxæmic. He held that rupture of the membranes was not indicated when the patient was not in labour, but that it was good treatment when labour pains were well established and regular. Packing of the vagina was not a simple procedure. It had to be properly done to be effectual. In accidental hæmorrhage and in *placenta prævia* the gravest complication that could be added was premature delivery. He thought that they should stop regarding *placenta prævia* as being unavoidable in all circumstances. The condition could often be diagnosed by careful antenatal examination. The patients with *placenta prævia* were seen either before or after the commencement of hæmorrhage. He thought that when *placenta prævia* and a viable child were diagnosed before onset of hæmorrhage, Cæsarean section was the proper line of treatment. Cæsarean section was not justifiable after hæmorrhage had commenced. Braxton Hicks's method was difficult and dangerous if it was not done properly, but when properly done it was not dangerous. The important thing in regard to *post partum* hæmorrhage was anticipation. Appliances should be in readiness for the treatment of *post partum* hæmorrhage. He had no objection to manual removal and uterine douching in *placenta prævia*. One method of treatment that Dr. Brettingham-Moore had not mentioned was injection of sterile solution into the umbilical vein of the cord. He thought that plugging with gauze was the sheet anchor of the obstetrician in treating patients who did not respond to other methods. He did not find that a large amount of gauze was necessary to tap the uterus.

Dr. Brettingham-Moore in reply said that rupture of the membranes was only a part of the treatment of accidental hæmorrhage. If the child were small and viable, he thought the vaginal section was very useful. Concealed accidental hæmorrhage was always a serious condition and palliative treatment was usually of no avail. He did not advocate hysterectomy in every case of uterine apoplexy any more than he advocated resection of the bowel in every strangulated hernia. The treatment depended on the condition of the uterine wall. If he thought that the uterine wall was extensively invaded by hæmorrhagic infiltration, he opened the abdomen and inspected the uterus and if such a condition were found, he performed hysterectomy. Toxæmia in Australia was the chief factor in the causation of accidental hæmorrhage. In closely congested industrial centres accidental hæmorrhage caused by trauma was likely to occur.

Dr. Cameron in reply said that he was pleased to hear Dr. Sutherland and Dr. Hughes describe the same type of hæmorrhage as he had discussed. He always dreaded having to perform manual removal of the placenta, but he thought that it should be done for this condition. The choice often lay between manual removal of placenta and death of the patient. Half of the patients had been seen by him only after the commencement of hæmorrhage and in them speedy and hasty measures for the control of the hæmorrhage had to be adopted.

The Reflexes of Labour.

Dr. Mary C. De Garis (Geelong), in a paper entitled "Pain and Other Reflexes in Labour: The Mechanism and Sources of Visceral Pain," paid special attention to pain and vaginismus. She said that if Mackenzie's view that labour pain was a viscero-sensory reflex from the contracting uterus were accepted, it might be held that there were also viscero-motor and organic reflexes. The efficiency of a muscle might be estimated not only by the work which it did, but also by the reflexes which it produced, in other words, by the ease with which it did its work. There was probably a play of reflexes on as well as from the uterus. Further, experimental work suggested that the normal stimulus to labour was carried by the blood rather than by the nerves, that the nerves played a regulating rather than an initiating part in labour, that the pathology and physiology of the labouring uterus were chiefly humoral in origin. The unpleasant reflex might be taken as a call to other organs to come to the assistance of the active organ. The reflexes observed in labour might be classified under the headings of viscero-sensory, viscero-motor and organic reflexes. Polarity was probably merely the proper equilibrium and time relation of the reflexes. The chief warning reflexes were the sense of advance and the sense of impending defæcation; the chief helpful reflex was bearing down; the chief hindering reflexes were pain and vaginismus. Dr. De Garis proceeded to discuss the two latter. Vaginismus or spasm of the vagina and perineum was very common in the average primiparous labour, but rarer in multiparous labour. It was by far the commonest cause of delayed advance of the presenting part, of delayed rotation, of difficulty with the shoulders and of laceration. Vaginismus was a disturbance of polarity as well as being a viscero-motor reflex. Pain was inversely related to the degree of efficiency. The frequency of the pain seemed to have little bearing on the efficiency of the contraction. When the metabolism was normal, only normal reflexes were produced. When there was an abnormal metabolism, due to some deficiency or toxicity affecting the health of the muscle fibres and possibly the nerve cells too, the abnormal osmosis or the abnormal chemical reactions produced stimulated the nerve endings to stronger and even most unpleasant reactions. Efficiency of a muscle could be assumed to depend ultimately on its blood supply. The constitution of the blood depended on the intake of the body. By looking at the reflexes of labour in this way they were enabled to determine the effects of diet and focal sepsis on labour, they could diagnose and treat functional delays in labour and by it they would also be able to develope a treatment which could increase the efficiency of labour.

The Control of Labour Pains.

Dr. H. Leighton Kesteven (Bulladelah) discussed the control of labour pains by morphine and anæsthesia. He said that he had on a previous occasion maintained that the first of the three stages of labour should be divided into two substages. He also held that the second stage should be similarly divided. The first substage of the second stage was initiated by the distension of the vagina and the second substage by the painful stretching of the perineum. There were three types or periods of pain: reflex uterine contraction, secondary power pain reflex on vaginal distension, secondary power pain reflex on perineal distension. Pains of the first type were purely reflex and quite beyond voluntary control. It was probable that uterine contractions in the early stages of labour were sometimes inhibited by fatigue products; in other words, the failing effort of the uterus was the response to a protective inhibitory mechanism. In these circumstances, until the contrary was proven, no pituitrin or other uterine stimulant was indicated, but morphine and complete rest during the first stage of labour. The pains of the second type were reflex, but they were under a definite degree of voluntary control at first. Their inhibition was caused by fear. It would be found that a light degree of anæsthesia would abolish the inhibitory factor. There were possibly at least two components in all pain in the human subject; one was a feeling of discomfort and the other was a mental component, either fear or closely related thereto. The violent expulsive efforts which characterized the second substage of the second stage, were the uncontrolled struggles of desparation. The controlling factor was not fear but actual terror. In this stage anæsthesia, somewhat deeper than before, was all that was called for to abolish the controlling factor. The social and psychical changes which had come with the modern advances of medicine, and the changed attitude of mind on the part of women had caused him to adopt radical methods and the sympathetic study of his patients had led him to the recognition of the psychical factors and their treatment.

Dr. L. Jona (Melbourne) in discussing the paper by Dr. De Garis said that she had stated that patients often complained of a tearing pain without any actual tearing of the tissues, but it was possible to have laceration of the deeper tissues without laceration of the mucous membrane or skin. He thought that pain was a protective reflex and that it was felt before damage to the tissues had been produced. A good deal of the pain was of a colicky nature due to irregular contraction and stretching. This was shown by the pain experienced by the patient when being operated upon under local anæsthesia when tissue was put on the stretch. In labour pain was caused by the pressure of the fœtal head on the nerves and viscera in the pelvis. Morphine in some form was the best analgesic. It acted centrally in the alleviation of pain, it relaxed the sphincters and stimulated the contractions of the muscle fibres. He related the results of investigations he had carried out on the effect of morphine on the uterine contractions in dogs, cats, guinea-pigs and mice. He found that 0·0125 gramme of morphine injected into a dog would cause contraction of the uterus, though a dog would stand the injection of 0·05 gramme.

Dr. H. Jellett (Christchurch) said that in the relief of pain during labour morphine was very good in the first stage of labour and that morphine with anæsthesia in the second stage often obviated the necessity for the application of forceps. In New Zealand he had introduced a method of administering chloroform by means of Murphy's inhaler. By this method the patient administered her own chloroform and as soon as the effect became manifest, the patient automatically ceased the administration. He found that they derived great benefit from it. In regard to manual dilatation of the cervix he thought that this could be dispensed with in normal labours. There might be a field for this procedure in women with a contracted pelvis, with the head above the brim, when the cervix was not dilated. Such a procedure would be necessary for any intrauterine manipulation, such as the introduction of a Champetier de Ribes's bag. He wanted to protest most strongly against the suggestion that dilatation of the cervix was at all necessary in modern midwifery except in very exceptional circumstances.

Dr. De Garis in reply stated that owing to the time at her disposal she was not able to finish her paper, otherwise she might have made some points much clearer.

Dr. Kesteven in reply thanked Dr. Jona for the information about the action of morphine on the uterine musculature. He suggested that vaginismus was distorted reflex due to fear and that anæsthesia abolished this fear and restored the normal reflex.

Gynæcological Methods.

Dr. A. Norman McArthur (Melbourne) read a criticism of modern methods of diagnosis and treatment in gynæcological practice. In regard to malignant disease diagnosis was often made too late for the best results to accrue. He thought that extraneous discharges had been overlooked. He made a plea for the use of radium in inoperable cancer of the *cervix uteri*. As far as diathermy was concerned, though he had had little experience of its use in carcinoma of the cervix, he would certainly use it for cleaning up a dirty fungating cervix. Diathermy was of greatest use in leucorrhœa and chronic conditions of the cervix resulting from gonorrhœa. Turning to the question of sterility, Dr. McArthur referred to the various methods of determining the patency of the Fallopian tubes and said that beyond that they had not advanced very far. Salpingostomy was seldom a success. The normal tube had an extraordinary recuperative power. The investigation of sterility in Australian patients was a matter of considerable difficulty on account of their inherent modesty. The husband was particularly difficult and often preferred to remain in doubt as to the vitality of his spermatozoa. The modern treatment of *prolapsus genitalia* was perhaps the most prominent feature of modern gynæcology. Vaginal plastic work alone would restore the normal condition. The main features of the operation were to do an extensive colpo-perineorrhaphy and to reproduce the normal axis of the genital canal. The best results in X ray therapy in gynæcological conditions were obtained by small doses extended over long periods.

Dr. Robert Fowler gave a demonstration of a portable apparatus for insufflation of the Fallopian tube.

Dr. C. Coghlan (Sydney) said he thought Rubinization was an awful name to use and felt sure that Rubin did not mean his name to be so mutilated. He showed his own portable apparatus for insufflation of the tubes and several hystero-salpingograms illustrating spasm of the cornual end of the tubes. He mentioned the employment of this apparatus for spasm of the tubes. Pregnancy had resulted after nine years' sterility after the administration of fairly large doses of belladonna. He did not think that the continuous suture as used by Dr. McArthur in salpingostomy was the ideal method of suturing. He preferred a Lembert suture.

Dr. E. R. White (Melbourne) described the method of insufflation used by Rubin at the present time. He was much impressed with the use of the quartering knife as he had seen in America. He thought it was very valuable in controlling hæmorrhage in myomectomy. He used Bonney's myomectomy clamp which must be very well applied to stop the arterial inflow. He thought that the electro-thermic knife would prove itself of great practical use in gynæcology. He did not think that the cervix should be cauterized in every case; only when there were pathological changes should it be so treated.

Dr. H. Jellett (Christchurch) said that he had not used the thermic knife, but would like to do so. Dr. Fowler's portable Rubin apparatus was practically the same as he had made himself some time previously. Myomectomy had always interested him and he thought it was the proper procedure to be adopted when a patient was in the child-bearing period. He recalled a patient from whom he had removed twenty-five myomata. The scope of salpingostomy was limited; it was suitable for hydrosalpinx. He did not think that success could be expected from an operation for blocked tubes when the block was at the cornual end. He did not agree with Dr. McArthur's remarks about Wertheim's interposition operation.

Dr. McArthur in reply said he was disappointed that nobody had touched upon the results of treatment of carcinoma of the cervix by radium or deep X rays. He thought that spasm of the Fallopian tube was produced by the mechanical manipulation entailed in the injection of the "Lipiodol."

Dr. Coghlan's apparatus compared favourably with that of Dr. Fowler. He maintained that patients for whom the interposition operation was employed by some men, could be more suitably treated by other operative procedures.

Dr. Robert Fowler in reply stated that the portability of Dr. Coghlan's apparatus was gained by the sacrifice of the volumeter, which measured the quantity of gas flowing in. He liked the cannula which he had demonstrated, but did not approve of the tap, as the sudden release of the pressure might produce spasm of the isthmus or other portions of the tube. He thought that gonorrhœa tended to produce stenosis at the isthmus, while streptococcal infections tended to produce occlusion of the tube at the other end. He thought it was hopeless to endeavour to obtain successful results by operating on a tube the isthmus of which was occluded.

Dr. Coghlan in reply to criticism by Dr. Fowler stated that the "Lipiodol" was not injected into the tube under as great a pressure as the gas; he did not think that the actual pressure of the "Lipiodol" could induce a spasm of the tube.

Natal and Neonatal Mortality.

The Section of Obstetrics and Gynæcology met together with the Section of Pædiatrics and the Section of Preventive Medicine and Tropical Hygiene for the discussion of the subject of natal and neonatal mortality.

Dr. R. W. Chambers, acting on behalf of Professor Marshall Allan, read a paper on natal and neonatal mortality. Professor Marshall Allan expressed the opinion that during the present century improvement in infant mortality had not been accompanied by any appreciable reduction in the rate for infants under one month of age, but was due to saving of lives at later periods. As this mortality was due mainly to antenatal and intranatal causes, the problem mainly concerned the obstetrician. In approximately 10,000 deliveries at the Women's Hospital, Melbourne, 554 fœtuses had been born dead. Of this number 13% had been macerated, 61% had been fresh stillborn and in 26% neonatal death had occurred. The causes of fœtal death were antenatal, intranatal, postnatal and neonatal. Antenatal death was not due mainly to syphilis, as had been taught. Only 20% of seventy deaths had been due to syphilis. Maceration in association with chronic nephritis and the toxæmias of pregnancy was more common. The important causes of intranatal death were asphyxia and birth injuries. Many postnatal deaths were due to intracranial injuries, but a certain number was due to aspiration of mucus. Most neonatal deaths were the result of causes operating during pregnancy and labour which were not sufficiently serious to cause death before delivery. The expulsion of the premature child formed the most important problem of neonatal mortality. Death from intracranial lesion was the second most frequent cause and pneumonia was also important. In the prevention of fœtal deaths it had to be remembered that the cause of the death of the child often extended back for years before the pregnancy. Periodical examination of both parents would protect the future offspring, but it was found that the father was most elusive and for practical purposes it was necessary to rely on the application of preventive measures to the mother after pregnancy had become established. Of the conditions which were preventible during pregnancy, syphilis was the most important. The toxæmias of pregnancy were equally important and malpresentations should not be forgotten. The principal condition preventible during labour was disproportion. Much of the fœtal loss, however, followed on ill-advised methods of delivery, particularly the premature application of forceps. This was associated with the need for thorough instruction of students. Asphyxia was the cause of many fœtal deaths. *Placenta prævia* could not be foreseen, but much could be accomplished by intranatal methods to improve the fœtal mortality. The prevention of neonatal deaths raised the question of prematurity and the need for better instruction of students in mothercraft. Professor Marshall Allan concluded that with improved antenatal and intranatal care a reduction of 40% of the present mortality rate might reasonably be expected to follow.

Dr. P. L. Hipsley (Sydney) started his paper on natal and neonatal mortality and morbidity with the statements that the mortality of infants in the first day of life had not decreased during the past ten years and that there had been a sharp increase in the death rate from injuries received during birth. From the records of the Royal Hospital for Women it appeared that one hundred babies of fourteen hundred and seventeen women were either stillborn or died soon after birth and that one hundred babies of thirteen hundred and ninety-one women were stillborn. The probable cause of death was given as follows: eclampsia, albuminuria and allied conditions sixteen, disproportion necessitating high forceps delivery or craniotomy fifteen, premature birth fifteen, macerated fœtus twelve, *placenta prævia* eleven, accidental hæmorrhage nine, breech presentation nine, persistent occipito-posterior presentation, manual rotation and instrumental delivery four, transverse presentation two, prolapsed cord two and ruptured uterus from fibromyoma and hydrocephalus one each. In three instances the child was born before admission and the cause was doubtful. In accidental hæmorrhage placental infarcts were common and the fœtus stood a poor chance of being born alive. In *placenta prævia* the fœtus was usually normal. The best results were obtained by Cæsarean section. The death rate was given at from 42% to 78%. The majority of infants delivered by the breech were well developed. Dr. Hipsley advocated cephalic version near term, but when this could not be done, the delivery of the after-coming head should not be hurried. The toxæmias of pregnancy were responsible for the greatest number of deaths of infants.

Since the establishment of a mothercraft department at the Royal Hospital for Women, there had been a considerable reduction in the loss of premature infants. The figures of survival were 55·3% and 58·3% in the two years before the department was established and 81·9% and 72·5% in the two years since the establishment. Dr. Hipsley dealt in greater detail with cranial and intracranial damage. The usual site of the tear was the *tentorium cerebelli*, close to its junction with the *falx cerebri*. The blood came from the vein of Galen, from the lateral sinus or from the cerebral veins. Hæmorrhage occurred apart from excessive trauma. It might be due to abnormal fragility of the blood vessels or diminished coagulability of the blood. Death at times resulted from cerebral compression without actual hæmorrhage. With appropriate treatment many infants recovered and developed normally. When intracranial hæmorrhage was suspected lumbar puncture should be performed as soon as the signs of shock had passed off. This had to be repeated until definite improvement was manifest. The injection of healthy blood was needed if there was decreased coagulability of the blood or other hæmostatic measures could be adopted. Trephining was carried out at times, but the operation mortality was very high.

In dealing with *asphyxia pallida* Dr. Hipsley warned against unwise attempts at artificial respiration. An infant's lungs could be expanded rhythmically with a mixture of 95% of oxygen and 5% of carbon dioxide; this led to the rapid establishment of spontaneous respiration. In regard to syphilis as a cause of infantile death, he pointed out that when the disease was recognized before the middle of pregnancy the death rate could be reduced to negligible proportions. In discussing congenital atresia and stenosis of the bile ducts, Dr. Hipsley claimed that the condition was often amenable to surgical treatment. As a rule the general condition of the infant was good and remained so for several months. Similarly it was advisable to give surgical treatment a trial for congenital atresia of the duodenum. Some infants with exomphalos could be saved by surgical means. Finally he dealt with

maternal infections as a cause of fœtal morbidity. He held that when the mother had even a mild infection, great care should be exercised on account of the possible serious effect on the fœtus.

Stillbirth and Neonatal Death.

Dr. Agnes Bennett (Wellington, New Zealand) read a paper which was based on the clinical study of ninety-two stillbirths and neonatal deaths in two thousand deliveries. She grouped her cases under seven headings. Group I comprised stillbirths and neonatal deaths due to congenital weakness and prematurity. Of the ninety-two cases 43% were in this category. In New South Wales the percentage occurrence of this group was 46% and for the whole of New Zealand 60%. The largest number of stillborn and weakling children was born of albuminuric mothers. Dr. Bennett referred to the importance of blood pressure estimations and said that one attack of high blood pressure was sufficient to bring about the death of the fœtus *in utero*. It was her practice to give nitrites as soon as the blood pressure rose above a certain level. Group II comprised fatalities due to congenital weakness and postmaturity. If a pregnancy went beyond full time, it was her custom to attempt to induce labour by means of drugs. She found that one patient in nine was subjected to this treatment. The causes of postmaturity were mechanical and toxic. Under the latter heading hypothyreoid and gastro-intestinal conditions were considered. Group III comprised eleven stillbirths due to congenital abnormality. The deaths under this group were part of an irreducible minimum which had to be faced. With more *post mortem* examinations an increasing number of congenital abnormalities was being discovered. Group IV comprised infections. In her series two neonatal deaths were the result of septic infections and two stillbirths were septic in origin. It was impossible to eliminate infection of the child during its passage through the vagina. At the same time a great deal could be done by removing vaginal mucus from the child's mouth before its first inspiration. Dr. Bennett was of the opinion that sufficient emphasis had not been laid on the vulnerability of the new-born to outside infections. Group V comprised intranatal deaths. Seven of the series had been in this group and four had been due to cord complications. Group VI included deaths due to traumatism. Two deaths in the series had been due to *ante partum* hæmorrhage. In Group VII the death was due to an unknown cause. The series included seven of this nature. In discussing this group Dr. Bennett referred to experiments carried out on rats which had repeatedly given birth to dead fœtuses when they were deprived of vitamin *E*. Vitamin *E* had been found in wheat oil and wheat oil was being used to prevent abortion in cattle. Dr. Bennett hoped to be able to secure a preparation of this nature which was fit for human consumption, and to carry out experiments with it.

Dr. S. W. Ferguson, the President of the Section of Pædiatrics, regretted that there was not sufficient time to permit the members to discuss these papers.

SECTION OF NEUROLOGY AND PSYCHIATRY.

Psychiatry.

Dr. W. Ernest Jones (Melbourne) in his address traced the advances that had been made in the science and study of psychiatry during the period of his own experience, thirty-nine years. He referred particularly to what had taken place in England and Wales and referred to the gradual recognition of the necessity for special study of psychiatry. He pointed out that in British universities and schools all psychological training had been neglected at a time when psychology had formed part of the curriculum in other countries, particularly in Germany and America. He then traced the development of the provision of treatment for persons whose insanity was doubtful or transient. He mentioned the provision at Royal Park for the treatment of persons suffering from recent and curable insanity and said that the establishment of Broughton Hall marked a still greater advance. In regard to the care and control of the feeble-minded, this subject seemed to be slipping beyond the grasp of the medical profession. The educationalist and the lay psychologist had come into the picture and an attempt was being made to regard the question as an educational problem rather than a medical one. There was, unfortunately, a tendency to overlook the fact that conduct was the all important evidence of mental integrity and could not be wholly determined by entirely artificial measurements. Dr. Jones went on to emphasize the necessity for training in psychology as well as in psychological medicine. He referred in terms of appreciation to the course of study for the diploma in psychological medicine at the University of Sydney. It did not appear possible that a similar course could be adopted in other States on account of the small numbers of possible applicants. Dr. Jones expressed the opinion that the University of Sydney should be assisted to maintain this diploma and that facilities should be provided for graduates in other universities as well as for medical officers in mental hospitals to carry out as much of the preliminary work for the diploma as possible in their own spheres before undergoing an intensive course of study at the hands of the Professor of Psychiatry of the University of Sydney. He pleaded for the establishment of a uniform system of examination for attendants and nurses in all mental hospitals and institutions of a similar nature. He laid stress on the desirability for the formation of psychiatric clinics in all large hospitals and for the provision of well equipped wards to which patients might be admitted.

Malarial Therapy in General Paralysis of the Insane.

Dr. Clifford Henry (Sydney) read a paper embodying the results of treatment by malaria of patients with general paralysis of the insane. He said that up to July 16, 1929, he had treated with malaria 84 patients suffering from neurosyphilis. In all 190 persons had been treated in the department. The total number of patients with general paralysis admitted during the previous years was 349. The percentage of patients not treated by malaria who were able to earn a living, was nil. The percentage of those treated by malaria who were discharged and able to earn a living, was 7·5. The percentage of those not treated with malaria who were discharged, but unable to work, was 6·6. Those treated with malaria, discharged, but unable to work, was 7·5. The percentage of those untreated, but greatly improved two months after admission, was 1·6. Those treated by malaria in this category numbered 19·2%. The percentage of those not treated by malaria, but slightly improved two months after admission, was 12·8; those treated by malaria in this category numbered 15·3%. The percentage of patients not treated by malaria whose condition was stationary six months after admission, was 18·5. The percentage of patients treated by malaria in this category was 15·4. The percentage of patients untreated by malaria whose condition was worse two months after admission, was 21·6. Those treated by malaria who were worse two months after treatment, numbered 8·9%. The percentage of patients untreated by malaria who died up to two months after admission, was 21·5. The percentage of patients treated by malaria who died up to two months after treatment, was 11·3. Dr. Henry said that malarial therapy should not be undertaken in patients with advanced active tuberculosis or with severe renal disease. There appeared to be some parallelism between the mental and physical improvement and the serological condition. At the same time a patient with definite clinical improvement often showed no corresponding modification of his response to the Wassermann test and but few patients had been observed in whom the curve representing the response to the gold test became less pronounced.

Malarial Therapy.

Dr. R. S. Ellery (Melbourne) read a paper on malarial therapy. He said that fever might alter the course of any psychosis, but such alteration occurred only occasionally; it was not justifiable to use fever therapy as a routine in the majority of psychoses. He had not found malaria treatment of any benefit in *dementia præcox* and neither katatonic, hebephrenic nor paranoid patients appeared to

give any response. In so-called idiopathic epilepsy, while the number of seizures tended to diminish during malaria, the ultimate state remained the same after treatment. He was sure, however, that when the epilepsy was of syphilitic origin, malaria might be of considerable benefit. Patients with syphilitic hemiplegia had derived only indirect benefit. Few lesions of the nervous system were uncomplicated and therefore in treatment consideration should not be given to the question of the presence of general paralysis or cerebral syphilis, but energy should be directed to the treatment of neuro-syphilis as a whole. Believing that any patient with neuro-syphilis might sooner or later manifest cortical involvement, he had not hesitated to give malaria to all patients in whom the examination of the cerebro-spinal fluid revealed undoubted evidence of syphilitic infection. Dr. Ellery then gave a short review of his experience with malaria therapy and said that during the previous twelve months he had treated ninety patients with neuro-syphilis. Thirty-eight or 42% had been discharged; 31 or 34% had been improved, even the worst of them had become useful dements; 21 or 22% had been unimproved by treatment. There had been no deaths as the result of treatment. The ninety patients had not been selected, but had been taken in all stages from that of mild euphoria and facial tremor to the advanced condition approaching the classical third stage of general paralysis. The result of treatment of 27 patients in the early stages was satisfactory; 23 or 85% had subsequently been discharged and the condition of the remaining four had remained stationary. When the neuro-syphilitic responded favourably to malaria, not only were the mental symptoms banished, but improvement frequently took place at the sensory motor level and the serological reactions tended to disappear. In his concluding remarks Dr. Ellery reminded his audience that 4% of untreated paretics had spontaneous remissions and he gave it as his experience that it was possible to bring about a remission in from 60% to 70% of unselected hospital patients. In half of these the remissions would amount to a clinical cure. He thought that malarial therapy should be regarded as a federal health matter.

Dr. J. Bentley, Dr. E. J. T. Thompson and Dr. R. G. Williams (Claremont) gave a full account of the application of pyrexial treatment of nervous and mental disorders in patients at the Hospital for the Insane, Claremont, Western Australia. The authors recorded their dissent from the view that general paralysis of the insane was merely one form of neuro-syphilis and that there was no advantage in differentiating general paralysis of the insane from other syphilitic conditions. They held that general paralysis of the insane was a distinct entity. While they held this view, they recognized the advisability of applying malarial treatment to patients with neuro-syphilis as well as to patients with general paralysis of the insane. They formed the opinion that the diagnosis of general paralysis of the insane should not be made unless the characteristic mental symptoms, the physical signs and the serological reactions of this disease were obtained. They therefore regarded it as essential that the Wassermann test should be applied to the blood of all patients and to the blood and cerebro-spinal fluid of all those whose mental disorder was indefinite. Two unsuccessful attempts had been made to infect patients with malarial blood obtained from Adelaide. The blood had not been in good condition when received. Eventually a patient with benign tertian malaria had been obtained. As it was proposed to pass the infection on to non-syphilitics as well as to syphilitic patients, some *Anopheles annulipes* had been fed on the blood of the malaria patient and had been infected. The general paralysis patients had then been infected by allowing the mosquitoes to feed on them. The incubation period in the patients had varied between seven and sixteen days. As a rule the patient had been allowed to have from ten to twelve rigors before quinine had been administered to arrest the malarial infection. The periodicity had been somewhat irregular in many of the patients. In seven of the thirteen patients the ague had run a full course, four had had nine rigors, one eight rigors and one seven. Many of the patients received "Stabilarsan" as well as the malaria treatment. Of five patients with general paralysis of the insane two had had definite remission as a result; a third had benefited considerably and was being employed usefully in the institution; one had improved sufficiently to justify them in discharging him to his friends. The fifth had been slightly improved. Of three patients with neuro-syphilis two had improved considerably, while the third had been in so advanced a stage that there was little hope of an arrest of the disease. Three of the patients had had manic-depressive insanity. Some improvement had been noted in two; the authors stated that it was too early to record the effect of the treatment in the third. One patient had been suffering from *encephaliis lethargica;* the treatment had effected little change. The last patient had had *dementia præcox;* in him some improvement had been noted. In the selection of patients, all those with syphilitic infections had been given the advantage of a trial. Albuminuria and pyuria were not regarded as contra-indications, while cardio-renal conditions were held to exclude the treatment, unless great improvement could be obtained. The authors were not in a position to form any conclusions whether better results could be obtained from malaria and an arsenical preparation or from malaria alone. They advocated a control of the therapy by liver function tests, especially tests for urobilin and urobilinogen. They found that during the malaria infections agglutinating substances appeared in the blood of the patients active towards the enteric group of bacteria. They anticipated that some valuable information would be obtained in connexion with the biochemical and immunological changes associated with the malaria infection.

Dr. John Bostock (Brisbane) related his observations on patients treated for certain mental diseases by injections of typhoid and paratyphoid bacilli vaccines. He had witnessed a dramatic effect of an intercurrent attack of pneumonia on a patient with *dementia præcox.* As blood containing malaria parasites was not available, he endeavoured to test the effect of protein in general paralysis of the insane, *tabes dorsalis* and disseminated sclerosis. He found that for some unknown reason intravenous injection of the vaccine produced very variable results. In general paralysis of the insane he observed some temporary improvement in one out of five patients. Five patients with *tabes dorsalis* derived considerable benefit, particularly in regard to the lightning pains and the general condition. In disseminated sclerosis the treatment proved quite useless.

Dr. M. H. Downey (Parkside) gave an account of the experience gained at the Parkside Mental Hospital in the treatment of general paralysis of the insane by infecting the patients with malaria. Dr. Ellery had sent him in January, 1928, some defibrinated blood containing benign tertian parasites. Eleven patients had been infected with this blood. The first patient had been in the first stage of the tabetic type of general paralysis. His mental symptoms had disappeared and he had been able to resume his previous occupation. His physical signs had not diminished. The second patient had been in the second stage of the expansive type. He had become much improved physically and some improvement in the mental state had been noted. The third patient had been in the late first stage of the tabetic type. He had improved both physically and mentally and had been able to return to his previous occupation. The fourth patient had been in the late first stage of the expansive type. The treatment had led to some physical improvement, but the mental condition had remained practically unchanged. The fifth patient had been in the third stage of the expansive type. The treatment had had the effect of improving the physical condition; the patient had become cleaner and tidier, but had remained demented. The sixth patient had been in the third stage of the tabetic type. At first slight improvement in the mental state had been noted, but after this the patient had had an apoplectiform seizure and later had become very depressed. He had died three and a half months after the termination of the treatment. The diagnosis of the condition of the seventh patient had been acute mania, probably preceding general paralysis of the insane. Complete recovery had taken place. The eighth patient had been in the first stage of the expansive type. Some improvement had been achieved; the patient had lost his delusions of grandeur, but had become suspicious and hostile. The ninth patient had been in the third stage of

the tabetic type. While considerable improvement had taken place in the physical condition, the mental state had remained unaltered. The tenth patient had been in the second stage of the expansive type. Dr. Downey was of opinion that in patients with such advanced conditions it might have been unwise to induce ten malarial paroxysms. Epileptiform seizures had occurred and the patient had died about four weeks after the commencement of the treatment. The eleventh and last patient had been in the first stage of the expansive type. The treatment had been successful in restoring this patient to normal mental health. Thus, of eleven patients four had become normal mentally and had resumed their occupations; four had benefited greatly, but had been kept under control, while three had died either while under treatment or later.

Dr. R. Ellery (Melbourne) exhibited a film illustrating the malarial treatment of general paralysis of the insane as carried out at Mont Park. The remarkable improvement in patients was graphically demonstrated by photographs before and after treatment.

"Tryparsamide" in General Paralysis of the Insane.

Dr. E. T. Hilliard (Orange) read a paper on the use of "Tryparsamide" in the treatment of general paralysis of the insane. He pointed out that this pentavalent arsenical preparation was said to be less toxic than the members of the trivalent arsenic compounds. It had been used in trypanosomiasis and later for syphilitic conditions of the nervous system. The first essential was to carry out a complete serological examination. It was held that when a Wassermann reaction was obtained with the cerebro-spinal fluid and the same fluid yielded a paretic colloidal gold curve, the diagnosis of general paralysis of the insane could be made, even in the absence of physical and mental signs. Failure to obtain a Wassermann reaction with the blood could not be accepted as excluding the diagnosis. Before "Tryparsamide" was given, it was necessary to carry out a careful ophthalmological examination. Optic atrophy noted in patients treated with the drug was said to be caused by the syphilis rather than by the drug, but Dr. Hilliard held that it was necessary to be aware of any involvement of the optic nerve before the treatment was begun. The dose usually selected was three grammes. He began with two grammes and increased the dose later. The salt was dissolved in ten cubic centimetres of freshly distilled water. The injection was made into a vein. The patient was kept in bed for twenty-four hours if possible, after the first injection. He advocated a preliminary course of iodides and mercury. During the period of medication with "Tryparsamide" the patient should be watched carefully for signs of dimness of vision. At times the signs and symptoms of the disease increased; in these circumstances it was necessary to keep the patient in bed and even to interrupt the course for a time. Other untoward symptoms during the course were fever coming on twenty-four hours after the first injection, jaundice, a transient urticaria, erythema, œdema of the face, vasodilator symptoms and exfoliative dermatitis. When these symptoms were noted, it might be necessary to reduce the dose or to stop the injections. The American observers had claimed a remission rate of 35·2% after treatment with "Tryparsamide." Dr. Hilliard stated that 60% of the patients were undoubtedly benefited by the treatment. The patients who derived the greatest benefit, were the excited, expansive, psychotic type; the dull paralytic, tending to become demented, was less favourably influenced. In some mental hospitals treatment by "Tryparsamide" was followed by malaria treatment.

Dr. W. Ernest Jones (Melbourne) said that nothing had given so much food for thought as seeing the work that had been done in the treatment of general paralysis. It had always seemed a reproach that they could do nothing for a large number of patients who were otherwise healthy, decent individuals. They could claim that something was being done. Although in the past spontaneous remissions occurred in something like 3% of general paralytics, they were only temporary and he had no recollection of a cure of *dementia paralytica* until he saw patients treated by malaria. It gave hope for the future that research along these lines would help in the cure of other conditions.

Professor W. S. Dawson (Sydney) said that it was beyond doubt that there had been a remarkable change in the prognosis of affections diagnosed as general paralysis of the insane. The remark of a celebrated English alienist that he could diagnose general paralysis and therefore did not introduce malaria into his hospital, reflected the old pessimistic view of the disease. It was with good reason that the Nobel Prize had been awarded to Wagner-Jauregg. Professor Dawson had not had any great personal experience in malarial treatment and would like to hear from the others what could be done to make patients who apparently had a natural immunity, susceptible to malarial inoculation. He showed the section the temperature charts of two patients treated in England with relapsing fever. Good results were claimed from this mode of fever therapy, but it had its disadvantages inasmuch as the fever could not be controlled so readily as malaria. It would appear that the spirilla treatment had been introduced on homœopathic principles.

He had had more experience with "Tryparsamide" and had been privileged to use one of the early batches of that drug received into England. He had obtained good results. Out of twenty patients thirteen definitely improved, although only one could be said to have made a complete recovery. It was difficult to assess the relative value of "Tryparsamide" and malaria and it was the practice at the Royal Prince Alfred Hospital to give malaria and to follow up with "Tryparsamide" and bismuth. This combined treatment seemed to be doing the best for the patient.

Dr. A. W. Campbell (Sydney) remarked that as a neurologist he was not altogether qualified to discuss this very important subject. He belonged to preserological days and had had much experience with general paralysis. At that time to diagnose this condition was to give a pronouncement of death; the death sentence was no longer inevitable. A great deal had been said about the confusion of cerebral syphilis and general paralysis and doubt had been cast on the reliability of figures indicating amelioration of general paralysis by pyrexial and other forms of treatment. It had been discussed as to whether or not the malarial parasite was a killer of spirochætes. It was a matter for inquiry as to why general paralysis should react so well and *tabes dorsalis* not so well. He did not doubt that general paralysis and cerebral syphilis, when properly diagnosed, were distinct entities. As to the cure of the sclerosed tracts in tabes, this seemed to him to be as impossible as to restore a nerve cell once destroyed. The main point was that they had in these forms of treatment described a method of attack in a disease that had formerly been absolutely fatal. It was important to concentrate on early recognition of the condition to give the patient the benefit of the new possibilities of recovery.

Dr. J. F. Mackeddie (Melbourne) thanked the neurologists for their perseverance in introducing the malarial treatment in hospitals. General paralysis had formerly been a hopeless condition; the whole outlook of the treatment of mental cases had had a stimulus and encouragement that was formerly unknown. Some years previously, when in England, he had come in contact with the early application of malarial therapy. Sir James Purves Stewart had been dissatisfied with malaria alone and had used "Salvarsanized" serum by the cisternal route. He had obtained an early return to normal of the serological reactions of the cerebro-spinal fluid by this means. To Dr. Mackeddie it seemed a deadly form of treatment. He recalled a patient who had been treated at the Alfred Hospital. All went well until the fourth injection, when the patient died. At the Mayo Clinic he found that they were getting good results by "Salvarsan" administered by the spinal route. At the Rockefeller Institute they were doing early work with "Tryparsamide," a form of treatment which he considered more satisfactory than malaria and without the disadvantages of the latter. Probably at the moment combined treatment with malaria and "Tryparsamide" was to be commended. In two patients treated with "Tryparsamide" the results had been good. A number of patients proved immune to malaria inoculation.

Dr. S. J. Minogue (Sydney) said that malaria and "Tryparsamide" had been used at Broughton Hall for two years. Apparently "Tryparsamide" was as useful as malaria in the treatment of neurosyphilis. He was not able to draw a sharp dividing line between general paralysis and other forms of neurosyphilis. Serological reactions were not entirely satisfactory foundations for differential diagnosis. With regard to the changes in the blood of patients undergoing malarial treatment, the reduction in the number of erythrocytes was not great; towards the end of pyrexia the figure reached four million; in one patient it had been as low as two and a half million. Frequently a colour index over one was found; in one patient it had been 1·25. Under ordinary circumstances the presence of such a high index with reduction in number of the red cells would be indicative of pernicious anæmia. Yet in these conditions the blood picture returned to normal a few days after quinine was exhibited. A leucopenia was usually found, the white cells falling in number to an average of four thousand per cubic millimetre. It had been stated that lymphocytosis occurred. This, however, was not invariable and the degree of lymphocytosis changed from day to day. The relative increase was usually in small lymphocytes. The shortest incubation period at Broughton Hall was thirty hours after the intravenous injection of five cubic centimetres of blood. After this experience the subcutaneous route had been used. As a routine a daily count was made of the number of infected red cells to a hundred leucocytes. In one patient the figure was two thousand; nevertheless, the patient's physical condition being satisfactory, the injection had not been terminated and the outcome had been satisfactory. In one patient melanin had been found in the urine, an indication of the destruction of the red blood cells.

Dr. S. E. Jones (Sydney) was interested in the report of the success in Western Australia in the inoculation of a patient with malaria by the medium of a mosquito. This is the ideal method of transferring malarial infection, inasmuch as it was an uncontaminated inoculation of malarial parasites and lent itself conveniently to the storage and transfer of the parasite over considerable distances. At Broughton Hall an attempt had been made to transfer malaria by mosquitoes, but it had been found to be impossible to persuade the mosquitoes to accept human blood, although they could be persuaded to suck a solution of sugar and water.

Dr. O. Latham (Sydney) referring to the cerebral changes and mode of action of malarial therapy remarked that the more he saw of the reaction of the brain in infections, the less could he be sure of the specificity of such reactions. Recently he had been examining a series of brains of patients dead of encephalitis and had found changes that were common to varied ætiological factors. With regard to serological tests, in those persons in whom syphilis was an accidental accompaniment, weaker reactions were obtained. In America, in the brains of patients who had died during the course of malarial treatment, they had found disturbances of the endothelial cells of the blood vessels. It was suggested that the vessels might have become more pervious to antibodies which were present in the blood, so that they would gain access to the spirochætes in the cerebral parenchyma.

Stammering.

Dr. T. Garnet Leary (Melbourne) read a paper containing a plea for the introduction of a definite system of education of the stammering child before his disability became fixed and complex. He stated that stammering was more prevalent among the English-speaking people than among others and was the outcome of innate or acquired defect in psycho-physical coordination, aggravated by the complex demands of environment and the keen sense of self-identity developed by civilization. He held that the subject was in need of sympathetic research. He maintained that stammering rested on fear, self-consciousness, anticipation of failure with consequent psychic strain and storm. He drew a picture of the handicap of the stammering school child and the discomfiture of the child on becoming conscious of his disability. The handicap became exaggerated when the child came to choose a vocation and was reflected in his social life. He showed that treatment after the fear complex had become established and fixed, was much more complex than treatment as soon as the speech defect was detected. Relaxation and ease were the essential conditions. The treatment consisted in suggestion and autosuggestion, with reeducation and the acquirement of a speech technique designed to establish harmonious interaction. The principles of rhythmical speaking were adopted. He found that success was attainable if the treatment was begun at an early stage.

Dr. Leary demonstrated two boys who suffered from stammering. He explained that in dealing with a stammering child it was essential to put him at ease and to induce relaxation. When relaxation was obtained, stammering disappeared. The next point was to get the individual to talk to rhythm and to a simple air. The person was then asked his name and was instructed to answer to an air (as "Jack and Jill"). Dr. Leary pointed out that he himself was speaking rhythmically and to an air, although this might not be noticeable to those present. Subsequently training was carried out in classes, so that the stammerers could assist one another; the children were encouraged to speak in a soft, low, modulated tone and to believe that they would succeed in speaking naturally. Above all it was necessary that conditions under which a stammerer could be laughed at on account of his defect should be strictly avoided.

Stammering was incoordination and was worse if it occurred in the left-handed, itself an indication of incoordination. The difficulty was with articulation; there was no trouble with vowels. Articulation brought other muscles and other innervations into play, as occurred also in organic lesions.

Dr. Ernest Jones thanked Dr. Leary for his paper and regretted that the boys who had been shown were only mild stammerers, as they did not offer Dr. Leary an opportunity of demonstrating his methods of which he had personal knowledge.

Dr. H. F. Norrie (Sydney) said that as a general practitioner who was interested in the endocrine treatment of various defects, he received for treatment a certain proportion of mentally retarded children and others with defects of speech. He supported Dr. Leary's plea for research and cooperation in the treatment of such conditions. He would like to ask whether Dr. Leary did not consider it desirable to raise the general metabolic state of stammerers and whether he had had radiological examinations made of the patients' skulls. Dr. Norrie had seen patients who had had only a small vocabulary; not being deaf, they did not belong to the class of deaf mutes. In several of them there had been a history of birth injury or severe fright and in some he had found abnormality in the lateral radiogram of the skull.

By the courtesy of the Director of Education, Mr. S. H. Smith, a visit was arranged to the special school for mentally defective children at Glenfield.

The superintendent of the school, Dr. Phillips, received the visitors and with his staff demonstrated the activities of the institution.

Psychogenesis.

Dr. Stuart Moore (Dunedin) dealt with the treatment by psycho-analysis of two patients suffering from manic depressive psychosis and of one suffering from melancholia. The first patient had been in a mental hospital for twenty years and had had one main delusion as well as several smaller delusions. She had been discharged from the hospital, although the delusion had persisted. He applied psycho-analytical methods and after some difficulty had obtained some free associations. The result of an incomplete analysis had been that the delusion had been removed. The second patient had had paranoid and masochistic delusions with hysterical obsessions. Under analysis the patient had realized the unreality of the delusions and they had been abolished. The third patient was a woman of thirty years suffering from melancholia. Psycho-analysis had been impossible at first and Dr. Stuart Moore had therefore offered interpretations which the patient had eventually accepted. Later he had obtained some free associations. The result had been eminently

satisfactory. He held that in all three there had been a definite homosexual stage and a paranoid reaction. He gave details of oral fixation encountered. Identifications had also been present. As a result of his experience he had come to the conclusion that he had been justified in using psycho-analysis in the treatment of certain forms of psychosis.

Dr. John F. Williams (Melbourne) read a paper entitled "Psychogenesis and Disease" in which he attacked the general conception of mind and body as separate entities. He objected to the term psychogenesis on the ground that it implied the existence of mind apart from matter or body. He adduced much evidence from the writings of physiologists and philosophers to support the views that the chemical, physical or biological processes were set in motion or started by psychological influences. He attacked the method of teaching students anatomy, physiology and biology and of leading them to conceive disease limited to an isolated organ or tissue. He pointed out that while the majority of medical practitioners had a clear idea of a simple reflex, Sherrington had stated that the simple reflex was probably a purely abstract conception and a convenient, if not probable fiction. He claimed that it was necessary to realize when they discussed the integration of an individual, that this was preceded by a process of artificial disintegration into hypothetical units. The effect of consciousness on the activities of the whole organism were considered and he came to the conclusion that the individual should be regarded as a biopsychical organism, some of the activities of which appeared to be stereotyped, unconscious and machine-like. He dealt with the influence of environment on the mind-body unit and adduced argument to prove that the causes of disease could be found not only in external parasites, but also in social environment acting as pathogenic parasites. He denied that structural changes in mental disease, for example, sufficed to explain either their origin or their nature. He dwelt at some length on the reactions of the organism to its social environment. The mind and the body were one and indivisible and the study of the body and its organs without consideration being given to the psychic element was unacceptable. In conclusion he quoted Plato who had stated that the great error of his day in the treatment of the human body was that the physician separated the soul from the body.

Dr. R. A. Noble (Sydney) could not agree with Dr. Moore that because a patient was contented and improved while in a mental hospital, she was symbolically in her mother's womb. The essential for treatment of an acute psychosis was rest and rest had been attained. An attempt to apply psycho-analysis during the acute stage would distress the patient and the conclusions arrived at would probably be false. A coherent analysis could not be obtained while the mind was so disturbed. After the acute stage had passed, analysis as a reeducational measure was of value. He expressed the opinion that since patients with manic-depressive psychoses passed from one stage of the illness to another under almost any form of treatment, it was not rational to ascribe any improvement to the analysis. Continuing, he said that it was known that manic-depressive psychoses ran a varying course. This seemed to indicate that the manic-depressive reaction had a biological disorder behind it, although there might be a precipitating psychological factor. When a patient was in a state of melancholia, it was known how distorted the delusions might be and to analyse the patient at such a time was only aggravating the condition. The duty of the psychiatrist was to give such a patient mental rest. If free associations could bring about anxiety regarding past life, they were doing harm. If psychological treatment gave rest, it was then indicated. Dr. Noble regarded analysis as a reeducative process. Freud's technique was rarely carried out in its entirety and unless analysis assisted the physician to give the patient hope, it would do more harm than good. During an acute psychosis no analysis likely to accentuate the patient's fears should be carried out. When the patient emerged from the acute state and became convalescent, psychological investigation might be carried out.

Professor W. S. Dawson (Sydney) said that Dr. Noble had wisely drawn attention to the dangers of basing therapeutic results on experience of manic-depressive psychoses. They saw so many patients recover with ordinary management and the feelings of guilt fade as the patients improved. This fact which to some extent discounted the effects of psychological therapy, should not be overlooked. More attention should be paid to the organic substratum that underlay so many of these conditions. Freud himself recognized that many conditions would ultimately be found to have an organic basis. The recent work of Freud had proved him to be more of a mental anatomist than a psychologist. In reference to the Schreber case, Professor Dawson understood that Freud interpreted only the autobiography. Returning to the question of the organic substratum, Pavlov had described types of temperaments in his dogs, for instance the excitable dog, that might easily become confused by the application of conditioned stimuli. He described how his dogs had been upset by a flood during which they had lost their conditioned reflexes. An interesting feature of Devine's recent book was the importance he attached to the organic substratum. Professor Dawson referred to the teaching of Dr. Mapother at the Maudsley Hospital and his insisting on the importance of hereditary and constitutional factors, such as the epochal crises, on the one hand and remote and recent psychological causes on the other.

Professor J. P. Lowson (Brisbane) stated that his own experience in the treatment of manic-depressive insanity by analysis had been small. He would not attempt to analyse, in the Freudian sense, a melancholic while the acute symptoms were present, but would recommend complete rest. However, he would not hesitate to analyse such a patient between attacks; such a procedure ought to be very valuable. Unfortunately with the recovery from the acute psychotic symptoms the patient did not appreciate the necessity to submit himself to treatment. On one occasion he had had the opportunity to analyse, though not completely, a man who had had an attack of acute mania. The analysis threw light on the causation of the attack. The affection was one of war neurosis, the main feature of which was that the patient had lost the self-respect which he had previously enjoyed. He had subsequently been married to a frigid woman. Normal relations had never been established and his domestic life had been extraordinarily unhappy. Most people gained their happiness from their relations to themselves and from their relations to other people. The patient had been deprived of satisfaction in both directions. Finally he had torn himself away from this state of affairs by passing into a psychosis. But for this concatenation of circumstances he might not have had an attack of mania at all. As the result of treatment he had improved and had held a good position for three years. Another patient also was interesting. Professor Lowson had not much confidence in labels, but had submitted the data to an alienist who had made a diagnosis of paraphrenia. The patient had hallucinations and delusions and had been certified as insane. The analysis had been continued for two years at which time the patient had been free from his hallucinations and delusions. He had become a hopeless neurasthenic.

In his reply Dr. Moore maintained that he had been justified in applying modified analysis to the patient with melancholia. The immediate results had justified him. He regarded melancholia as the last despairing cry for love. If they could give the patient some understanding of her condition, they were restoring something that was akin to love. He was sure that human social contact was a great help to these patients. Psycho-analysis could be carried out by anyone who recognized repression, transference and resistance. The term was therefore not confined to the followers of a cult. Dr. Moore felt that there was difficulty in raising the question of psycho-analysis and in doing the subject justice in a short time. With regard to the classification of analysts, the Freudians considered one a psycho-analyst who admitted the phenomena of repression, resistance and transference. Dr. Moore's experience was limited, but he agreed generally with what had been said about melancholia and acute mental states; constitutional factors had to be considered and their importance had to be admitted. He agreed that rest was

needed for these patients, but his experience had made him disinclined to accept it as a principle that patients who were acutely ill mentally, should not be helped psychologically. If melancholia was the last despairing cry for love, it was wrong to withhold understanding of that patient's mind. If the patient could be given contact with another mind, one could do him a great deal of good. The speaker would make no general recommendation concerning the application of Freudian analysis. Interpretation should be used freely and in acute conditions should be made boldly, since a formal analysis might be too exhausting. In regard to Dr. Williams's paper, it seemed to him that medicine was suffering not from the separation of the conceptions of the mental and the physical, but from the fact that they thought and spoke as if they had crossed the bridge between the mental and the physical.

Dr. Williams said that although the two papers had been bracketed together he was not in favour of the analytic approach to manic-depressive insanity.

Trauma and Functional Neuroses.

The Section of Neurology and Psychiatry met in conjunction with the Section of Surgery and the Section of Orthopædics to discuss the subject of trauma in relation to functional nervous disorders.

SIR HENRY NEWLAND (Adelaide) stated that during the war functional nervous disorders had been extremely common. The treatment had been hasty and perfunctory, owing to the exigencies of war. Often the men had received less active assistance and in consequence they had not been returned to their units as soon as they might have been, had the real nature of their condition been recognized. In peace time the same thing occurred. He instanced a workman who knocked his knee against some obstacle, such as a wheelbarrow. His doctor might have told him that he had probably damaged the cartilage. This idea often became ingrained in the patient's mind and led to a lasting neurosis. It was necessary to understand the state of affairs and to take steps to prevent the development of the neurosis. The trauma acted as a bait for the neurotic symptoms. It was unjust to blame the patient. The medical practitioner had the responsibility of preventing the occurrence of the functional nervous disorder.

DR. H. SKIPTON STACY (Sydney) presented a paper on the relation of trauma to functional nervous disease from the point of view of the surgeon. He called attention to the frequency with which many practitioners and especially the younger men made the diagnosis of functional disorder when an organic lesion existed. He gave instances of mistakes of this kind. He did not blame the young medical practitioners as much as their teachers. In regard to head injuries he wished to dispel the illusion that no cerebral injury existed when no fracture was disclosed by the skiagram. As a rule the severity of a cerebral injury could be gauged by the length of the period of unconsciousness, but a glancing blow at times caused cerebral contusion without signs of concussion or a subdural hæmatoma might form without producing symptoms for some weeks. Dr. Stacy dealt in some detail with the differential diagnosis of anxiety states and cerebral injury. Often the symptoms of the cerebral injury were accentuated by emotional states. In the next place he spoke of spinal injuries. In ascertaining whether the symptoms were due to functional causes or to injury, skiagrams taken in two planes were often valuable. He called attention to the fact that at times the lesion might not be evident for a considerable time; the effect of weight bearing sometimes appeared many weeks or months after the accident. The differentiation between functional disturbances and lesions of the spinal cord was often extremely difficult. The greatest difficulty arose when the injury led to an aggravation of a preexisting disease, such as *tabes dorsalis*. Complete absence of the deep reflexes, Babinski's phenomenon and the rapid development of bed sores were signs of organic changes. If none of these signs was present, the diagnosis of a functional condition would be admissible. The disturbances of sensation in organic lesions of the cord followed physiological principles, while in functional states the symptoms followed the patient's ideas. In functional paralyses, when the patient was asked to move the limb, both the flexors and the extensors were felt to contract, although no movement resulted. Complete loss of tendon jerks was a certain sign of organic disease. The electrical reactions might also help in the distinguishing of functional from organic disease. Dr. Stacy also dealt with injuries to the back. A thorough examination was essential. Attention should be paid to the site of tenderness which often gave a clue to the nature of the lesion. In conclusion he referred to the value of the psycho-galvanometer as a means of discriminating between functional and organic conditions.

DR. H. F. MAUDSLEY (Melbourne) pointed out that accidental injuries sustained in industrial occupation were frequently associated with functional disorders. The main problem was that concerned with the complication of convalescence by psychogenic conditions. Traumatic neuroses constituted a definite entity. He classified the conditions into the following groups: traumatic hysteria or psychoneurosis, traumatic neurosis, traumatic psychasthenia and traumatic psychosis. In the diagnosis there might be difficulty in distinguishing physiogenic from psychogenic symptoms. Early diagnosis and intelligent treatment of functional symptoms were essential. The type of patient, the emotional factor of fright at the time of the injury, the grievance factor, the effect that the physical after effects of the trauma might have on the emotional side and the economical stress that the patient might have to go through should be taken into account. Dr. Maudsley held that the confusion of shock with fright often led to the overlooking of the psychogenic symptoms. He exemplifies this difficulty by relating the histories of some patients who had had a terrifying experience and later had suffered from traumatic psycho-neurosis. He held that the continued payment of weekly compensation engendered a fear reaction. At times there was a conflict between fear of starvation and the desire to earn full working wages. The longer the compensation continued, the worse the symptoms became. He illustrated the grievance factor and showed that while malingering could be excluded, the disability might arise as a result of an attack on the patient's self-esteem. Properly directed suggestion sufficed for these patients. In the next place Dr. Maudsley dealt with injuries to the head. Contusions often led to increase of intracranial circulation. The compression led to a condition of cerebral anoxæmia which was manifested by confusion, irritability and stupor. In the milder forms there might be headache, dizziness, tinnitus, loss of mental concentration and sundry subjective symptoms. Psychotic symptoms were likely to appear during the regenerative process. In regard to functional nervous disorders, he distinguished head injuries without fracture of the skull, injuries in persons who suffered from concussion and injuries in persons who suffered from neither fracture nor concussion. He had noted that many patients after head injury manifested an organic neurological condition. Dr. Maudsley cited the histories of some patients who had suffered head injuries and had responded to this injury in different ways. In one patient the head injury seemed to lead to narcolepsy. He wished that medical practitioners had a wider knowledge of psychological medicine.

PROFESSOR J. P. LOWSON (Brisbane) restricted his paper to an account of a functional disorder following a trauma. The patient, a railway employee, had fallen from the top of a tender on to his head and had been unconscious for twenty-four hours. Three months later Professor Lowson had seen the patient. He had been very weak, had been unable to stand erect for more than a minute. He had spoken slowly and with difficulty. He had been very nervous. Professor Lowson had detected slight psychotic symptoms. Close inquiry and intimate conversation had gradually revealed a considerable amount of information. He had discovered that although the patient had slipped from the tender, he had been terrified while falling and had had the delusion that he had been kicked off the tender by an enemy. Later, Professor Lowson had discovered signs of sexual abnormality. Although it had not been practicable to apply psycho-analysis, he had been successful in revealing to the patient the real state of

affairs and the patient had recovered and returned to work. He used the history to illustrate the fact that when a functional nervous disorder followed a trauma, the latter acted merely in letting loose the consequences of a previously existent mental instability.

Dr. S. J. Minogue (Sydney) presented a paper on the nervous and mental effects of trauma as reflected in the patients observed at the Broughton Hall Psychiatric Clinic. The experience gained at other hospitals for mental diseases was taken into account. Dr. Minogue found that mental disease following trauma formed less than 2% of all forms of mental disease among patients admitted to hospitals for the insane. On the other hand almost any mental disease might arise after trauma. At times the trauma precipitated a psychosis in a predisposed individual. These conditions were not true traumatic psychoses. The true traumatic psychoses were confusion, dementia, epileptic insanity and moral imbecility. In but a few patients with traumatic confusion, but in many of those with dementia and epilepsy the trauma was solely responsible for the mental disease. Alcohol was frequently a contributing factor. The Jacksonian fit was infrequent in traumatic epilepsy. A tendency to *status epilepticus* was often present. All varieties of neuroses were encountered in patients after trauma. The prognosis in traumatic neuroses depended largely on whether the patient was in receipt of compensation or not. Neurological lesions, uncomplicated with mental changes were seen after trauma. Not one mental or nervous sequela to trauma was characteristic of the traumatic form.

Dr. W. Marshall Macdonald (Dunedin) said that attempting to deal with such a subject in fifteen minutes was like sending a boy into a forest with a small tomahawk to cut down a tree. He proposed to deal simply with the question as to why neurosis followed trauma and he began with the paradoxical statement that trauma in itself never caused neurosis. For purposes of simplicity he proposed to confine his remarks entirely to pithiatric troubles. He dealt first with the effect of pure emotion, then of emotion and trauma and finally of trauma alone. As an example of the first he instanced Surgeon Dide's experience in 1915. He had been attached to the 24th battalion of Alpine Chasseurs when they were exposed to a very heavy bombardment in which they had lost some 30% of their effectives under trying conditions, as the men had to remain immobile under shell fire which caused much mutilation among their comrades. Dide had met them falling back from their trenches; their faces had been haggard, their eyes staring, their gait stumbling, they had not answered when spoken to and they had not fully realized where they were. In other words they were in a state of mental confusion. Dide had collected them and had addressed to them what he aptly called "*une courte théorie morale.*" The men had rallied, recovered their *morale* and marched back to take up their places again in the trenches. No functional nervous affections had occurred amongst them. If profound emotion was capable of causing functional nervous disorders, surely this was an occasion in which it might have been expected to occur, but in the absence of suggestion, still more in the presence of counter-suggestion, no hysteria had followed. As a result of Dide's experience the French War Office early in 1916 had established a series of advanced neurological centres all along their front at a distance of about fifteen kilometres from the front trenches. These centres had been placed under the control of skilled neurologists and had received all men with commotional syndrome, confusional states and the like and these men had been treated with great success within hearing of the guns. It was noteworthy that the base hospitals for functional nervous disorders had received no patients from these advanced neurological centres. They had drawn their supplies almost entirely from men with slight wounds which had been treated in auxiliary hospitals by Red Cross nurses and, indeed, in some instances it had been possible to tell from which hospital a man had come from the nature of his neurosis. As an example of the effect of emotion and trauma he related briefly the account of the torpedoing of the liner *La Provence* which he had heard Clunet deliver at the first Interallied Congress of Neurology in Paris in 1916. When the steamer had been torpedoed, the result had been a species of panic amongst the men. They had run about wildly with eyes staring, they had cried out incoherently, they had fired off revolvers and finally a veritable epidemic of suicide had occurred. Clunet had asked an officer who had fired his revolver in the air, why he had done so and he had replied: "To stop the panic." Many of the men had spent the night on small rafts which had been half submerged. To Clunet's raft seventeen men had been clinging with the waves washing over them. They had picked up some provisions and Clunet had encouraged them to rub each other. A soldier from Martinique had begun to utter doleful lamentations and to pray aloud to the Holy Virgin. This had upset the men and so Clunet had threatened to throw him overboard. An amusing but very gross Moroccan story had served to reestablish the *morale* of the men. None of these men showed any subsequent pithiatric phenomena. Among the men who had been picked up by the torpedo boat destroyers from the other rafts had been some thirty with quadriplegia, paraplegia, mutism, spasmodic weeping, continual laughter, hiccup, barking and tremor. Clunet had taken these men down to the engine room, had stripped them naked and set sailors rubbing them with rough gloves soaked in alcohol. He had submitted them to flagellation, encouraging them all the while with compliments on their speedy recovery which ensued in all in about ten minutes. From this account it was obvious that profound emotion *plus* physical strain and exposure to cold did not suffice to cause pithiatric disorders in the presence of vigorous counter-suggestion. The result of pure trauma, such as serious concussion of the brain, was a period of unconsciousness followed by mental confusion with increased suggestibility, but never immediately by functional nervous disorder. In none of these three conditions was neurosis a necessary sequel unless auto- or hetero-suggestion intervened. The increased suggestibility was possibly due to some alteration of resistance in the synapses like that which was said to result from toxæmia in persons in whom nervous or mental disease was due to focal sepsis, but this proposition was not susceptible of definite proof. In conclusion Dr. Macdonald insisted on the importance of carrying out the Déjerine treatment of pithiatric conditions with absolute strictness. The only way to insure success was by strict isolation on a diet of milk only and by the rigid exclusion of all books, papers, letters, flowers, mural decorations, needlework and above all visits from relatives. Half measures were worse than useless.

Dr. N. W. Markwell (Brisbane) pointed out that while organic nervous lesions following trauma were not traumatic neuroses, a functional element might become superimposed on the gross trauma. Traumatic neurosis was a psychological state that occurred during a reaction set up by an easy period of life after some trauma. Dr. Markwell regretted that medical practitioners usually had no interest in the psychological aspects of medicine. He had had men sent to him by the Workmen's Compensation Department suffering from neglected effort syndrome. He had advised that the patients should be energetically handled to prevent further development of the neurosis. When he had seen such a patient after the lapse of a year, he had found that nothing had been done and that the patient had become more neurotic than before. He recited the experience of the wrecked crew of *La Provence*. The ship had sunk seventy minutes after having been torpedoed and the survivors had been on rafts for eighteen hours. Thirty out of the six hundred men had suffered from mutism, shaking, incessant weeping and various plegias immediately after they had been rescued. Clunet had taken each of these thirty men into a warm room near the stokehold, had given them a drink of rum and had rubbed them vigorously. While he had been speaking to them in a kindly manner, he had smacked them harder and harder until they had been cured of their symptoms. Each individual treatment had taken ten minutes. He had saved them from a chronic neurosis. The differential diagnosis was often difficult. Even after organic disease had been excluded, there was the difficulty in distinguishing neurosis from hysteria or malingering. Great care was needed.

DR. R. NOBLE (Sydney) thought that the President of the Section of Neurology and Psychiatry should appreciate the confidence placed in the neurologists by the suggestion of physicians and surgeons that neurologists should deal with patients suffering from traumatic neuroses. One thing of great importance was to discover the unconscious motive underlying the neurosis. He recommended an early lump sum settlement in compensation cases. Teachers of medicine should instruct their students in the importance of the psychological factors.

DR. J. F. MACKEDDIE (Melbourne) said that they were much indebted to Trotter who had left the domain of major surgery and invaded the physician's realm of minor brain trauma. Years after the original trauma he had opened skulls of patients who had complained of malaise and headache, and had found œdema of the brain and of those in whom there had been a focal and local response to the trauma. This method had been supported by that of Penfold, of New York, who by using Dandy's method of air injection by the thecal route had demonstrated adhesions and had relieved the symptoms by this procedure. Foster had called it *arachnitis serosa*. It behoved them to investigate the physical condition underlying trauma as well as the psychological factors.

DR. R. ANGEL MONEY (Sydney) endorsed the remarks of Dr. Sewell and Dr. Mackeddie on the importance of a careful investigation of physical conditions before the patients were transferred to the neurologist or psychiatrist. Minor injuries and organic changes that might have been present for years, were often responsible for the neurotic symptoms. Ventriculography, encephalography, injection of air, of dyes, radiological examination, all these methods were of value in investigating and Queckenstedt's test might be used to show whether or not the pathways through the *foramen magnum* were free.

In his reply Dr. Stacey remarked that his paper was a protest against the too frequent diagnosis of functional disease in cases of trauma not only of the head, but of other parts of the body also.

Dr. Maudsley had nothing to add and thought the ground had been well covered. He had found that workmen employed in lofty places, as on high buildings, seemed specially liable to develope traumatic neuroses.

The Psycho-Galvanic Reaction.

PROFESSOR W. S. DAWSON (Sydney) gave an account of the records obtained by means of a modification of the usual apparatus used for measuring the changes in resistance of the skin to electrical currents as a result of emotional states. Instead of employing a highly sensitive galvanometer, such as that of Einthoven, he interpolated a wireless valve by means of which the minute currents were magnified. The new apparatus was portable and could be applied at the bedside. Professor Dawson discussed the views that were held by various observers in regard to the psycho-galvanic reaction in normal persons, in katatonics, in hebephrenics and in other psychopaths. With normal subjects the latent period varied within certain limits according to the type of stimulus. The response to an emotional stimulus was a gradual, slow movement of the needle. The stimuli used were word associations, the relation of events, threats of pin pricks and actual pin pricks and the like. In his own experience Professor Dawson endeavoured to correlate various clinical syndromes with special types of reaction. He found, however, that there was no constant association between the clinical syndromes and the types of psycho-galvanic reaction. Over 50% of galvanometric responses were obtained to word association tests in two patients out of nineteen with *dementia præcox*, in seven patients out of twenty-one with manic depressive psychoses and in thirteen patients out of twenty-one with neuroses. The response to physical stimuli of over twenty-five points was obtained in nine patients with *dementia præcox*, in seven with manic-depressive psychoses and in seventeen with neuroses. Seven patients suffering from *dementia præcox* yielded a response in relating history, as did eleven of the patients with manic-depressive psychoses and fifteen with neuroses. It thus appeared that neurotics displayed more psycho-galvanic excitability than persons afflicted with manic-depressive psychoses or than schizophrenics. Among the melancholics those who were loudest in their expressions of remorse and misery, proved very little responsive to the tests. Professor Dawson noted that many of these patients were void of emotional warmth. He did not hold the view that neuroses and psychoses were self-contained entities; neurotics could become psychotics. Further, he remarked that patients with war experience failed to give large deflections when reciting their unpleasant recollections. Apparently the lapse of time had rendered the memories less acute, even though the verbal expression had remained dramatic. He gave detailed accounts of some of the typical responses in patients with stupor, with traumatic neuroses, with compensation neuroses and with functional hyperæsthesia. He found that it was still desirable to seek a method of studying pain objectively.

DR. R. C. WINN (Sydney) said that in the film he had shown to the Section of Neurology and Psychiatry at Broughton Hall he might have exaggerated its usefulness. It might, however, be that other uses besides those indicated in the film would be possible. He had tested a patient who had had a sympathetic ramisection done on the right arm. This patient, instead of giving no psycho-galvanic reflex when the electrodes were attached to the right hand and wrist as would have been expected on theoretical and other grounds, gave somewhat diminished responses to all forms of stimulation as compared with the responses obtained when the electrodes were attached to the left hand and wrist. It was possible that further work on patients after ramisection would prove that the sympathetic system did not form a necessary pathway for the psychogalvanic reflex or the psycho-galvanometer would be found to be an instrument of value in the diagnosis of conditions suitable for this operation and in controlling the results of operation. He expressed the opinion that the fact that workers at the University of Sydney had developed a portable instrument would lead to the psycho-galvanometer being used in clinical work to an ever increasing extent as was the case with the sphygmomanometer which was originally a laboratory instrument and became a clinical one only when it was rendered readily portable. When listening to Dr. Bell speaking on peptic ulcer before the Section of Medicine it had occurred to Dr. Winn that the psychogalvanic response might be of use in patients who did not suffer pain. A rough test had suggested that these individuals were hyposensitive to painful stimuli of all descriptions. The psycho-galvanic reflex should prove a more reliable indicator as it was objective in character. G. Blake had evolved a psycho-galvanometer in which was incorporated a wireless valve. The description of this instrument had been published a month later than that described by Martin, Langford Smith and Bellingham. He had used a two electrode valve instead of the more efficient three electrode valve and had arranged his circuit so that another subject could be substituted for the usual fixed resistance and thus allowed of a kind of tug-of-war effect. This modification had been incorporated in the instrument which Dr. Winn used. Stimulation of one subject would always lead to deflection of the galvanometer needle in one direction and stimulation of the other subject to deflection in the other direction. When a common stimulus, such as a sudden sound, was used and provision was made that both subjects would be stimulated equally, the needle swung to the side corresponding to the more sensitive. This provided a method of comparison between subjects which was valuable in differentiation between conversion hysteria and anxiety hysteria. Patients suffering from anxiety states yielded exaggerated reactions; such patients could be compared with subjects who were approximately normal.

DR. STUART MOORE (Dunedin) said that this was his first close acquaintance with the psycho-galvanometer and he had been very interested in hearing about it. In considering the phenomena recorded, would it not be useful to view it a little more from the psychological aspect? Was the absence of response in a hysteric, manic or melancholic patient due to the fact that the apparent emotion was a defence against the expression of the real emotion? In several cases mentioned by Professor Dawson it seemed that if the phenomena were considered from this point of

view, it would be found that the patients were concealing their real emotions. The difference between intellectual and affective response might be widened to explain such a mechanism as he had indicated.

Dr. S. Evan Jones (Sydney) congratulated Professor Dawson on the work he had done with the psycho-galvanometer. Those who were familiar with the psycho-neuroses realized that emotional instability was characteristic of these conditions. It was of considerable psycho-pathological importance to determine whether the instability was acquired or regressive or whether it represented a failure of evolution of this aspect of the psyche. While the Binet-Simon and other methods were available for estimating with some degree of accuracy the intellectual development of patients, no equivalent method was available for determining the degree of affective development. The psycho-galvanometer provided an objective record of the emotionality of the patient, but one criticism of this instrumental method was that the stimuli that were ordinarily used, were mechanical and far removed from the effect-producing situations of everyday life. In the management of some hysterical patients very gross displays of emotion were frequently observed; yet these patients showed little reactivity on the galvanometer. In America an attempt had been made to bring the provocative stimuli nearer to natural situations by recording the reactions of the patient, cardiac, respiratory and galvanometric, while watching a cinema film which presented emotion provoking scenes.

In reply Professor Dawson remarked that Dr. Winn's reference to the presence of a psycho-galvanometric reaction in a patient after ramisectomy opened a valuable field for research. He thought that Dr. Moore's suggested explanation of the absence of pronounced reactions in some persons did not take into consideration the fact that the psycho-galvanic reaction was involuntary. The value of the psycho-galvanometer might be in assessing temperamental types and might reveal the form of the neuroses, while, though it might not elucidate the ætiology, it might indicate why a patient reacted by depression or anxiety state or by profound abulia.

Confusional Psychoses.

Dr. S. Evan Jones (Broughton Hall) discussed the ætiology and nature of the confusional psychoses, basing his findings on the data collected at Broughton Hall. The ætiological factors proved to be very diverse. Alcohol and cerebral disease appeared most frequently in histories; a psychogenic element was common, while pulmonary disease and nephritis, the puerperal state and general infections were noted in many of the histories. From a consideration of the histories he found that toxins with special affinity for nerve tissue, such as alcohol, direct involvement or disturbance of the cerebrum and intense and prolonged emotion were the most important contributing factors. The psychoses attacked females more often than males. In females the incidence was greatest between the ages of twenty and fifty and in males between thirty and sixty. Heredity did not appear to play an important part. The tendency to recur was low; after recovery the prospect that the patient would remain in good mental health was good. Dr. Evans Jones discussed in some detail each of the factors which appeared to have some ætiological significance. In turning to the course of the affection he pointed out that in those who recovered, the improvement was rapid, but relapses were not infrequent. At times the improvement was gradual. The mean duration in males was six months and in females seven months. Death resulting from exhaustion often occurred within one month. The chronicity rate was low. The symptoms were mental and physical. Among the former were retardation and poverty of ideation, defect of memory, loss of impressibility and retention and inability to recall former experiences. Aimless restlessness and impulsive actions were common. The majority of the patients had hallucinations. They were usually noisy, incoherent and depraved. For practical purposes Dr. Evan Jones classified the confusional psychoses into stuporose confusion, the dull inactive type, acute confusion, the delirious type and the hyperactue type. The physical symptoms were very varied.

Very little opportunity had presented itself to study the pathology of these conditions. In one patient who had died five weeks after admission, some thickening of the pia-arachnoid had been found in the right superior fronto-parietal area with infiltration with mononuclear cells and small extravasations of blood. Other slight changes had also been detected. It appeared that the main pathological change in confusional psychoses was chromatolysis of the neurones of the cortex. In conclusion Dr. Evan Jones endeavoured to analyse the psycho-pathological factors of the conditions.

Dr. J. Williams (Melbourne) recalled the fact that Henderson and Gillespie had contended that confusion was not a clinical entity. He asked if the confusional patients belonged to the cyclothymic group. In reference to traumatic neuroses, he saw many patients who attributed their symptoms to trauma; it required great consideration to determine whether the trauma had any ætiological significance.

Dr. Stuart A. Moore (Dunedin) said that he had noted the difference of point of view in approaching the subject. He had an impression that they were dealing with questions raised in Dr. Williams's paper on psychogenesis. As long as they continued to hold to the idea that they had come to the bridge between the psychic and the organic, they would not advance in the understanding of psychoses. It seemed desirable that it should be realized that any patient could be approached from the psychic side, whether the condition was organic or not. Coordination of the organic and psychological approach was highly desirable, but the great need was the psychological approach.

Dr. J. Bostock (Brisbane) thought that the work on confusion was important. This type of case was one he had difficulty in understanding. He had recently had under his care a woman who had exemplified this reaction very well. She had been hirsute, had been frightened to go out and had suffered from insomnia. She had become acutely confused. She had made a complete recovery after a difficult period of illness. The recognition of confusional symptoms was of practical importance. In reference to Dr. Moore's deploring the organic method of approach, it was a question of practical application. Confused patients could not be examined psychologically. It must be agreed that very few persons who had suffered head injuries, became psychotic. There was usually a previous psychopathic tendency in patients who developed traumatic neuroses.

Dr. R. Noble (Sydney) considered that a useful purpose had been served in pointing out the clinical entity of confusion. The main factor in confusion was toxic or cerebral irritation or profound emotion. Concerning the psychogenic conditions he thought that the confusional state was really a defence mechanism and that it was in consequence a state of regression to an earlier mode of reaction. It was important in giving a prognosis to be able to say how long a psychosis was likely to last. He agreed that death frequently occurred early in the disease. In the early stages the diagnosis was difficult. In some obviously toxic conditions the toxic focus could not be found. There was difficulty in differentiating some confusions from schizophrenia; at times they began with initial confusion. Dr. Minogue had shown that confusion occurred after simple fractures. Dr. Noble had seen a woman who had become acutely confused two weeks after fracture of the humerus. He had known confusion to occur after accident when there was no evidence of the presence of a fear reaction. He thought such cases were definitely physical. Dr. Minogue had referred to the epileptic reaction after trauma. A history of a fall was very frequently given in connexion with epilepsy, but the epilepsy was rarely due to the trauma. He agreed with Dr. Bostock's criticism of the psychological approach. They should trace the chain of causation; every psychoneurosis had certain factors leading up to it and each must be considered.

Dr. W. Ernest Jones (Melbourne) said that female patients with Korsakoff psychosis in an inebriate institution often did well and the condition in but few of them relapsed. He suggested that Dr. Minogue should investigate the relation of trauma to general paralysis. It

seemed that something more than syphilis was required to produce this sequel of syphilitic infection and it was possible that this something was trauma.

In reply to Dr. Williams, Dr. S. Evan Jones stated that he did not think in view of the absence of recurrences that confusional patients were of cyclothymic temperament. He agreed with Dr. Noble that the chain of causation in each case should be followed as far as was practically possible, whether the links were psychological or organic.

Encephalography and the Use of "Lipiodol."

DR. J. F. MACKEDDIE (Melbourne) read a paper on encephalography and the use of "Lipiodol" in central nervous system diagnosis. He traced the development of the method since the first communication of Dandy in 1919. In the work at the Alfred Hospital they had used the method of Pancoast and Fay in which two lumbar puncture needles were employed, one for manometric use and the other for replacement. After trying the lumbar and the cisternal routes with only partial success, they had tried uniting air with "Lipiodol." This had been more satisfactory. In only three of twenty-four cases had they been able to make a positive diagnosis of the seat of the tumour. Two of these had been in the occipital region and one in the frontal. Dr. Mackeddie also referred to the use of "Lipiodol" in spinal block. He emphasized the fact that findings by this method were only one link in a chain of evidence and were not an infallible guide. In fourteen spinal conditions which were reasonably regarded as being of the nature of a compression, twelve had been made definite by "Lipiodol" suspension. Three of the patients had refused operation and the condition of one had cleared up. In six of the eight who were submitted to operation, the "Lipiodol" had been retrieved in close apposition to the block. In some of the cases the use of "Lipiodol" had removed any remaining doubt of there being an extramedullary condition present. In three it had been a necessity in regard to localization. They had not found what Donald Armour called sensory "Lipiodol" dissociation, but they had learned that in the pre-"Lipiodol" days the laminectomy had always been too low; loss of sensation at, for example, the first lumbar dermatomere, was accounted for by a lesion three segments higher, because some nerve fibres represented in the first lumbar dermatomere entered the cord by roots two or three segments higher.

DR. LYLE BUCHANAN (Sydney) read a paper on encephalography. He described encephalography as the injection of air by the lumbar or cisternal route in the subarachnoid space in order to show all the sulci and cisterns as well as the ventricles. He pointed out that the conditions which were known to involve the risk of spinal herniation of the medulla, were an absolute contraindication to the use of air as a contrast medium in encephalography. The scope and limitations of the method would become more clearly indicated with increasing experience. It might be concluded, however, that other methods were usually more suitable in cases of tumour of the brain and that there was a large number of chronic head conditions in which the method might be used and in which it would help towards more accurate diagnosis and more rational treatment. In cases of this variety there was apparently no mortality and no morbidity, provided adequate precautions were taken. It had been found that in some instances improvement in the patient's condition followed the use of the method. Reaction after the method had been used, in the form of headache, might vary in proportion to the disturbance of the subarachnoid space and possibly, therefore, in meningeal conditions in proportion to the need for curative measures and the reasonable prospect of therapeutic results. It seemed likely that with further evolution the method might eventually occupy a place in relation to cerebral surgery comparable to that of pyelography and renal lavage. It would always be subservient to and supplementary to clinical methods. Dr. Buchanan described the technique and showed several films which he had taken.

DR. J. O'SULLIVAN (Melbourne) referred to a patient in whom six months after an injury to the right side of the head epileptiform attacks had appeared, commencing in the muscles of the right eye and right side of the face. The attacks later had become generalized. A ventriculogram revealed that there was no filling in the right lateral ventricle and that the third ventricle was displaced to the right side. This indicated a morbid process in the left side in the fronto-parietal region. At operation a cystic glioma had been found.

He also showed skiagrams illustrating the investigation by "Lipiodol" filling in a patient with spastic diplegia. The presence of a tumour had been indicated and at operation an extradural hæmangioma had been found.

In reply Dr. Mackeddie remarked that definite therapeutic results had been obtained from these methods of investigation in cases of *arachnoiditis serosa*. He had seen patients at the Alfred Hospital in whom severe headache had cleared up after the diagnostic procedure. A patient in a condition of *status epilepticus* had been greatly benefited; later only occasional *petit mal* attacks had occurred. Dr. Mackeddie had not noted any harmful results from "Lipiodol" filling. By this method of investigation the line of demarcation was outlined and it brought out clearly the anatomical dictum that if there was a block at the first lumbar dermatomere, the block in the vertebral canal was at a higher level. Formerly there had been a tendency to perform laminectomy at too low a level.

Dr. Mackeddie concluded by showing a film which demonstrated the examination by Dr. Gordon Holmes of a patient with a cerebellar syndrome and one showing Dr. Purves Stewart performing cisternal puncture.

Mental Hygiene.

DR. R. A. NOBLE (Sydney) accepted the American definition of mental hygiene as "that body of knowledge which deals with the factors which modify the resistance of the individual to the stresses of life." The main objects of the movement were the protection of the mental health of the general public, the study of mental disorders and defects, their causes, treatment and prevention, the amelioration of conditions among those already suffering from mental disorder or deficiency. He included in the subject of the pure science of mental hygiene, biology and physiology, psychology, abnormal psychology, sociology, ethics, economics, education and anthropology. Under the heading of the applied science of mental hygiene he described the movement started in 1909 in America by Clifford Beers. In 1918 the movement had spread to Canada, in 1920 the French League of Mental Hygiene had been established and in 1922 the inaugural meeting of the British National Council for Mental Hygiene had taken place. In 1923 a national council had been formed in South Africa and one year later a provisional council had been formed in Australia. A conference had been held having for its object the formation of a council for mental hygiene in New South Wales. The objects had been defined. They included the education of the public concerning mental health and the building up of an enlightened attitude towards mental disorders, the furtherance of the best method of care and after care of the mentally afflicted, the furtherance of the establishment of psychiatric clinics at general hospitals, the promotion of the study and treatment of nervous manifestations in childhood, adequate provision for the care of the congenitally defective, the investigation of the problems of social maladjustments, the organization of social service and the coordination of all the resources of the community which had a bearing on mental hygiene. It was hoped to enlist the active cooperation of many well established organizations. It had been resolved to investigate the subject of the prevention and early treatment of mental disorders, the care, after care and treatment of the insane and mental deficiency and crime. In conclusion he stated that mental hygiene was an important field in which the guidance of those members of the medical profession who practised psychiatry, was needed.

DR. JOHN BOSTOCK (Brisbane) read a paper in which he sketched the essence of mental hygiene. Starting with the child, he pointed out that many of life's difficulties could be traced to faulty handling on the part of the parents or to bad home environment. He maintained that defects of emotion were more important than defects of intelli-

gence. He pleaded for institutional treatment of children. The intellectually retarded children were provided for. The emotionally unbalanced and retarded children and the emotionally and intellectually unbalanced normal and supernormal children needed special care. It was often useless to deal with the child in the school, since the cause in the home persisted. In the next place a trained psychiatrist should be employed in every college and university to handle students whose behaviour was abnormal. Mental hygiene in industry was important. The employer who failed to make individual adjustments, was likely to have on his staff of workers those who suffered from nervous and mental symptoms. As a maxim in mental hygiene he stated that a holiday was no remedy for overwork, if the prolonged hours of labour were continued at the end of the holiday. At times improved management and careful adjustment of difficulties would overcome the nervous strain. In the last place he pleaded for a complete reform of hospitals for the insane.

Dr. H. F. Maudsley (Melbourne) stated in his paper that the problem of mental hygiene had to be attacked during the early stages of development of personality. He maintained that the guidance in mental hygiene should be given by a medical psychologist. The neuroses, the psychoneuroses and the psychoses were medical problems and their prevention could be put on a scientific footing only by the cooperation between medical practitioners and the public. He approved of the employment of almoners and social service workers. He therefore pleaded for the better training of medical students in the psychological aspects of medicine. In regard to the question of sex education by school teachers, he advocated caution. Psychiatrists should cooperate with school teachers in the teaching of psychology. The establishment of psychiatric clinics was a distinct advance. The clinics should be separate from the mental hospitals, but a close cooperation should be established between the two and discharged patients should be encouraged to seek advice from time to time at the clinics. He thought that some beds in general hospitals should be reserved for patients in the early stages of mental disease. The public should be made to realize that the treatment of a mentally ill patient could not be properly carried out in the patient's own home. Psychiatrists had more difficulty with relatives than with patients.

Professor W. S. Dawson (Sydney) said that the members of the section felt that they had certain knowledge and facts that they would like to place in possession of the public and they needed the assistance of lay helpers to this end. Psychiatric treatment fell short in some ways through the lack of assistance to supervise the patients in their home environment. They must investigate and, if necessary, try to modify the environment. This was an important reason for the introduction of the mental hygiene movement.

Dr. Richard Arthur, M.L.A. (Sydney) said that he really had come there as a learner. He had no expert knowledge, but recognized that the aims of the movement were of enormous sociological importance. He wished the public could realize the truth of the facts presented by the speakers. More efficiency and more discipline were required amongst the adult population. If publicity could be given to the conclusions reached by the members of the section, it should assist the public to realize the needs of the position. Every week many people had their skulls fractured and he asked what was the ultimate effect of these traumata of the brain. To his mind it was of sociological importance to consider the question of alcohol. Heavy penalties had been imposed on the traffic in drugs which in the mass did not produce 1% of the damage done by alcohol, while they found that facilities for the consumption of alcohol were being forced on unwilling districts. Possibly at a later session of the Congress attention might be drawn to these subjects. Another important subject was the education of children in sex matters instead of allowing them as at present to pick up knowledge in a haphazard way.

Professor H. T. Lovell (Sydney) as a lay psychologist said that he desired to thank the members for the invitation to be present and for the opportunity to speak. He congratulated them on the initiation of the movement and Dr. Noble on the comprehensive account he had given of its aims. He was interested in the training of social workers and was prepared to help. Finance would be found to be a difficulty. There were two aspects of the work of a mental hygiene movement; the theoretical side required research, the practical side required the cooperation of a great many bodies. The problems of misadjustment of children went back to the home. There were frequently conflicts between the natural tendencies of the individual and his own rational standards and those of society. A great many parents were not fit to be parents at all. One aim of the proposed movement should be to train mothers. Just as the section of medicine devoted itself to the prevention of organic disease, so should efforts be made to prevent disease of the personality. He offered what support he could give to the movement. The work of the industrial movement had been of great value and had been carried out almost entirely by lay psychologists. It was the function of the psychologist to study the mind and he was in a position to render assistance in such a movement as that proposed.

SECTION OF PÆDIATRICS.

Diet and Nutrition.

Dr. Stewart W. Ferguson (Melbourne) in his address as President dealt with the subject of diet and nutrition. He said that infant feeding was in reality simple, but that very often slipshod methods were used. They could no longer attempt to imitate slavishly the percentage composition of breast milk. Fats and carbohydrates supplied fuel and energy and were concerned only secondarily in growth and development. The proteins were different and supplied the nitrogen. After referring to the difference between human and cows' milk, Dr. Ferguson said that the large curd formed when cows' milk entered the stomach was the cause of digestive disturbance. If the milk was allowed to simmer for five to ten minutes in a double boiler, a much finer and a more flocculent curd was produced. The only disadvantage of this method was the destruction of the antiscorbutic vitamin. This should be supplied by other more adequate sources. Carbohydrates were most usually neglected in the modification of cows' milk. Fat was the most difficult of all the factors in cows' milk to digest and had to be kept low. Hence the addition of sugar to the neighbourhood of 7% was more or less essential. This was frequently neglected. As a rule, dextrin-maltose was most easily tolerated and with cows' milk caused less disturbance than any form of sugar. Starch delayed the action of rennin with consequent reduction in the formation of curd. Barley water tended to lessen the coalescence of curds; it should form portion of the routine modification of cows' milk for infants. He was in the habit of allowing milk and water to simmer together with flour and dextrin-maltose. In regard to fats it was his custom to start in the very young with skimmed milk. The simmering of milk aided fat digestion, for the fat was not incorporated to the same extent in the curd. He counteracted the low iron content of cows' milk by giving to infants over six months of age a broth in which vegetables had been cooked. Growing children required relatively more protein than adults. Protein from animal sources was indicated during the period of growth. The commonest condition found by him in children over the age of three was chronic intestinal indigestion. Dr. Ferguson described the symptomatology of this condition and said that the prime factor was the excess of starch in the diet. In the treatment all coarse starches and cellulose should be eliminated and a full allowance of protein, mainly animal, given. A definite limit should be placed on the daily amount of milk; it was greatly overrated as a food for older children.

Asthma.

In a paper on asthma and other allergic diseases Dr. C. Sutherland (Melbourne) gave an account of recent work on this subject. The property of plasma that conveyed

the specific reaction in a hypersensitive person was known as reagin. The term atopen was used to signify any substance capable of exciting the symptoms in hypersensitive persons. Histamine had been found to produce asthma in suitable animals and atropine and adrenalin removed the effect. Tissues ground up to powder were found to contain a histamine-like substance. When the atopen and reagin reacted, the histamine-like substance was liberated. Hypersensitiveness was inherited as a Mendelian character; but it was only the tendency that was inherited. Dr. Sutherland explained this by referring to observations of his own. After having called attention to the appearance of hypersensitiveness to milk, cream and butter, both in infants and in adults, he passed on to the consideration of the effect on the allergic conditions of infective processes. Varicella and scarlatina at times brought about a permanent disappearance of the condition. The same took place sometimes after pneumonia or enteric fever. On the other hand, pertussis invariably made matters worse. There appeared to be a synergism between tuberculous toxins and the atopens. Patients who yielded von Pirquet's reactions, often gave multiple pseudo-reactions to various forms of epithelium and the like. In regard to treatment the best method was to avoid the atopen. If this could not be done, desensitization with increasing doses of atopen was usually successful. A long course was usually necessary. Vaccines and other forms of non-specific treatment were more uncertain. Vaccines, however, often yielded rapid and good results. He considered it unwise to employ surgical interference with the throat or nose, although when septic processes were found, they had to be eliminated. Correct diet, fresh air, exercise and ultra-violet light were useful adjuvants. In an analysis of his own cases he found that 82% of his allergic patients under the age of fifteen years manifested some degree of skin hypersensitiveness. The atopens included feathers, house dust, horse dander, pollens, linseed, egg, kapok, orris root and cattle hair. The final results in forty-six children were noted. Twenty-eight were treated by desensitization and of them sixteen were greatly benefited, four were slightly improved and eight remained unimproved. Nine children had been treated with vaccines. This usually stopped the attacks. Six were improved.

Dr. M. J. Plomley (Sydney) said that he had seen many children at the Children's Hospital with chest signs, dypnœa, occasionally bad colour and practically apyrexial, but with no definite asthmatic breathing. These patients responded well to atropine or adrenalin and were classified as asthmatic. The removal of adenoids often resulted in improvement and the tonsils should also be removed if infected. In those patients who had bronchitic signs or naso-pharyngeal infection, vaccines, preferably autogenous, had proved beneficial. He had used tuberculin only in one patient and it had proved very satisfactory.

Dr. J. Crawford Robertson (Sydney) expressed his disappointment with the results of protein desensitization, especially with food protein. He stressed the nervous element in the causation of asthma, especially in private patients belonging to nervous families. In this type of case suggestion should be used. He asked Dr. Sutherland whether in his experience the elimination of food protein was as successful in effect to the elimination of animal protein.

Dr. R. A. R. Green (Sydney) wanted to know whether the vaccine was used for its specific or non-specific qualities. In his experience a large number of asthmatic children had had abnormal tonsils and adenoids and had benefited by their removal.

Dr. W. C. Petherbridge (Sydney) thanked Dr. Sutherland and expressed his appreciation of the way he had concentrated on modern developments. He was convinced that many infants held to be bronchitic were in reality asthmatic and this became a certainty where the history revealed repeated similar attacks. He favoured potassium iodide for the treatment and a change of climate; he had been disappointed in the effect of adrenalin. He also thought that chronic intestinal indigestion was often associated with asthma in children.

Dr. A. P. Derham (Melbourne) said that his experience of asthma of bronchitic type in young children agreed with Dr. Plomley's in that tests for hypersensitivity were often useless and treatment with the exciting cause was found to be disappointing. In such cases, particularly in the more chronic and recurring type in young children, he had found the old fashioned potassium iodide and stramonium mixture very useful, though its action was slow. In the acute distressing spasm atropine or adrenalin was usually effective. He considered that in older children a third factor was often operative, in addition to the inherited hypersensitiveness and the specific exciting cause. This third factor probably varied in different patients, but it might be over fatigue, exposure to cold, general dietetic indiscretion or finally nervous excitement or stress. In one such patient under his care several attacks of alarmingly acute asthma had occurred, but they had all been preceded by a combination of over fatigue, excitement or exposure and some dietetic indiscretion. He agreed with Dr. Robertson that the nervous or psychological element was important in some forms of asthma and also in the allied conditions of migraine and so-called cyclical vomiting. In one child suffering from attacks of very severe recurring vomiting and headache almost complete cure had been effected by removing the patient from her school where she had been unhappy and overstrained to one where there were no examinations. Dr. Derham also thanked Dr. Plomley for emphasizing the underlying biochemical points of the condition.

Dr. S. W. Ferguson (Melbourne) congratulated Dr. Sutherland on his carefully prepared and instructive paper. He said that there was a type of asthma associated definitely with catarrh, the catarrhal type. He had seen many patients with this type; commencing with a fairly high temperature, the patients had become more and more distressed. In many of them post-nasal influences had been found and many were associated with chronic antral trouble. He found that this catarrhal type responded well to potassium iodide with which he always gave arsenic and stramonium. Vaccines had proved successful and he found that the most satisfactory one to use was the mixed influenza vaccine *B* (of the Commonwealth Laboratories). The action he considered to be probably non-specific. His experience of desensitization had not been encouraging.

Dr. Sutherland in reply thanked the speakers for their remarks. With regard to drugs he agreed that iodides were the most valuable. Ephedrine which had not been mentioned, suited certain patients, but had to be commenced in small doses, such as 0·03 gramme (half a grain), for an adult and proportionately less for a child. He was pleased that Dr. Plomley had expressed the opinion that many patients with recurring bronchitis were asthmatic. He had always felt that these conditions were due to allergy. Many children who were attacked with bronchitis every spring, were found to be sensitive to some pollen. He agreed that many patients benefited by the removal of tonsils and adenoids. He regarded vaccines as non-specific. With regard to eliminating causes, too much should not be expected. If there was no improvement after discontinuing a food protein for a few weeks, there was no use persisting. Tuberculin when it acted, frequently produced dramatic results. He had found that the mixed influenzal vaccine of the Commonwealth Serum Laboratories was the best. All endonasal infections should be cleared up. He agreed that the nervous element was most important and that home surroundings should be dealt with.

Surgical Diseases of the Chest and Abdomen.

In opening a discussion of the surgical emergencies of the chest and abdomen in childhood Dr. R. M. Downes (Melbourne) restricted his remarks to one or two problems that had arisen in his own practice. Empyema was one of the most frequent causes of death in the practice of the children's surgeon. He had ascertained the facts concerning 568 children who had suffered from this condition at the Children's Hospital, Carlton. The mortality was 28%. More than one half of the children who had died, were under two years of age. The deaths included those of children who had not undergone operation. In spite of careful examinations and repeated exploratory puncture the diagnosis was frequently made for the first

time at the *post mortem* examination. At times the empyema was a complication of some other dangerous condition. If septicæmia were excluded from the list, the mortality would be reduced to 16·5%. The mortality of empyema caused by streptococcus was more than twice that of empyema caused by pneumococcus. The mortality of empyema caused by staphylococcus lay midway between the two. Often the empyema was but a minor factor as compared with the massive consolidation and pus formation with its resultant toxæmia. At the Children's Hospital they had carried out preliminary aspiration before resorting to the more serious thoracotomy. It was frequently very difficult to determine whether the pneumonia in infants was in the acute stage or not. Aspiration was not easy and was often distressing to the children and to the operator. It should be carried out in hospital. Dr. Downes preferred simple intercostal incision to rib resection, but he realized that the latter was the more popular form of thoracotomy. It was rapidly performed, caused little shock and gave rise to small disturbance to the respiratory mechanism. Osteomyelitis of the rib did not follow it. The drainage tract could be kept open quite easily. At times aspiration sufficed to effect resolution, but as the procedure produced a great nervous upset to the child, the method of treatment should be adopted only for special reasons. Great care had to be exercised in regard to the drainage. Short tubes were used and they should be removed after two or three days. He employed either ethylene or nitrous oxide and oxygen.

The most common surgical emergency of the abdomen was appendicitis. The manifestations were not the same in children as in adults. The initial pain was often followed by vomiting; it was often situated in the right iliac fossa and not in the epigastrium. In the differential diagnosis between pneumonia and appendicitis the rigidity of the muscles of the right side of the abdomen, the pain on palpation and the absence of lung signs led to an erroneous diagnosis of appendicitis; more rarely the mistake was in the opposite direction. Primary streptococcal or pneumococcal peritonitis often simulated appendicitis very closely. The patient was usually more ill with peritonitis than with appendicitis. Dr. Downes called attention to the frequency of very slight signs of inflammation of the appendix. The surgeon usually removed the appendix, but he ventured to raise the question whether appendicectomy was always necessary. In Melbourne the surgeon often found thread worms in the appendix. The characteristic features of appendicitis in children were the fleeting nature of the abdominal tenderness, the abnormal vascularity of the abdominal wall and the presence of a considerable amount of free fluid in the abdominal cavity. In Melbourne the mortality among children with appendicitis was 5%. When the condition was complicated with abscess it was 13·5% and when peritonitis was present, it reached 29%.

Another abdominal emergency was intussusception. The mortality was 8·5%. When it was necessary to perform resection because of the impossibility to reduce the intussusception, because of the tearing of the intussusception or because of the apparent death of the bowel, the prognosis was very grave. The mortality might be reduced if the surgeon could recognize when reduction could not be carried out. It was at times useful to bring the damaged bowel and sufficient small intestine and ascending colon for anastomosis on to the abdominal wall and to close the wound temporarily with silkworm gut.

Dr. K. B. Fraser (Brisbane) said that it was very beneficial to hear the surgical methods in vogue in other and bigger centres. At the Children's Hospital, Brisbane, the only cases of empyema treated by aspiration were those of pneumococcal origin. All others were treated by immediate operation and rib resection was always performed. He made his incision in the postero-anterior axillary line when feasible and as low down as possible. This was of paramount importance, as it allowed for dependent drainage. He wondered if there were some other factors in empyema not fully understood. He quoted a case of *empyema necessitatis* in a child, aged eighteen months, who was admitted to hospital desperately ill; after draining for three months, the wound had been dilated to allow of better drainage and the child quickly made a complete recovery. Dr. Fraser said that he came across quite a number of patients with a history of recurrent attacks of colicky abdominal pain, low temperature and transient tenderness. If these patients failed to respond to anthelminthic treatment, he invariably removed the appendix. In a great majority there was no sign of any inflammatory change, but at the tip of the appendix was found a bolus of immature threadworms. He was quite convinced that these appendices should always be removed, as they invariably led to attacks of acute appendicitis later.

Dr. H. Boyd Graham (Melbourne) emphasized the desirability for cooperation between the surgeon and physician in treatment of threadworm disease associated with repeated attacks of abdominal pain. When an operation was carried out, the patient should be given the benefit of complete dietetic treatment and a full course for the extermination of the threadworms should be entered upon. In the event of proven threadworm infestation, after the physician had improved the condition of the patient, the latter should have the appendix removed, because it was so often the source of further threadworm infestation.

Dr. P. L. Hipsley (Sydney) thanked Dr. Downes for his very interesting paper. He had always been an advocate for dependent drainage in the treatment of empyema and practised rib resection in preference to intercostal incision. He agreed that many patients, particularly those suffering from the pneumococcal variety, did well after simple aspiration. The diagnosis of appendicitis in children was sometimes very difficult and its differentiation from acute pneumonia was not always easy. He had recently seen a case of impacted fæces in a girl, aged eight years, diagnosed as a ruptured appendix. Intussusception was generally easy to diagnose and a mass could be felt in every instance if sought for carefully. In the treatment of this condition he still advocated hydrostatic pressure from a height of one metre. The number of intussusceptions reduced by this means was well over 60%. The only possible argument in favour of operation in all circumstances was the supposed difficulty in deciding whether reduction was complete. As an intussusception could usually be easily felt before reduction owing to the fact that the abdomen was generally soft and flaccid, considerable distension after reduction due to the fluid having been forced through the ileo-caecal sphincter and into the small bowel signified that the intussusception had been reduced. The distension was so great at times that it would be useless to palpate for the purpose of determining whether portion of the mass had not been reduced. After reduction had been effected, but the abdomen did not become distended with fluid, a small muscle-splitting incision should be made in the right iliac region to verify the diagnosis.

Dr. M. J. Plomley (Sydney) said that he as a physician could only speak from a medical point of view. With regard to empyema he considered that there certainly should be cooperation between surgeon and physician. All patients with empyema at the Children's Hospital were seen by a physician and surgeon together. He maintained that operation should not be considered while the lung was consolidated, but aspiration was then the best method. He thought that this gave much better results. With regard to diagnosis he always tried to do without adventitious aids. He preferred to rely on signs and to use a needle if necessary for exploration. He usually did his needling without an anæsthetic, for he considered that the momentary disturbance caused by the prick of the needle was less upsetting for the child than the use of either a local or a general anæsthetic. Speaking of appendicitis he considered that acute pyelitis had to be considered in the differential diagnosis. He told of an interesting case that had come under his notice that of a cancerous growth of the appendix in a child aged four years. This was removed at operation by Sir Alexander MacCormick.

DR. E. H. M. STEPHEN (Sydney) also agreed with the value of aspiration, unless it was certain that the pneumonic process had resolved. He emphasized the value of a leucocyte count. Leucocytosis of 15,000 was an indication that aspiration should be done and leucocytosis of 30,000 to 35,000 indicated that operation would probably be necessary at an early date. He thought that radiography was very valuable in the diagnosis of empyema, especially in those of the interlobar type.

DR. E. H. WILLIAMS (Dunedin) also spoke as a physician. He quoted from Sutherland's book in which he stated that when an empyema was on the left side, the diaphragm rose with the receding lung and the gastric area extended to a correspondingly higher level. He told of a patient in whom at operation an opening had been made through the diaphragm and a large traumatic diaphragmatic hernia had been the result.

DR. L. H. ROGERS (Sydney) thanked Dr. Downes for his excellent paper. He agreed with him entirely in advising preliminary aspiration. He felt sure that this would be the means of saving many lives. He preferred local to a general anæsthetic. He also advocated intercostal drainage as described by Dr. Downes, but in the Royal Alexandra Hospital for Children it was his custom to use a long tube and the long end was left hanging down into a bottle of antiseptic. By this means the drawing of air into the pleural cavity on respiration was prevented. Many appendices contained threadworms.

DR. S. W. FERGUSON (Melbourne) noted the fact that the majority of the physicians who had spoken, had limited their remarks to the chest. He would like to say that he was rather surprised at the airy optimism with which Dr. Downes had dismissed the differential diagnosis between appendicitis and pneumonia. He had found that this was often remarkably difficult. He had seen many patients with acute pneumonia operated upon for appendicitis. He would also like to emphasize the point that in intussusception there was often considerable initial shock and that the condition was often transient and should be watched for carefully. When pain was not a prominent feature this was a great help in the diagnosis. Unlike Dr. Hipsley, he had not found that intussusception was easily palpated. The intussusception was often high up in the abdomen under the ribs.

Dr. Downes in reply said that he was glad Dr. Fraser had mentioned the danger of getting into a groove and always using the same methods. He had been very interested in what Dr. Hipsley had said about the injection method of reducing intussusception. He found that this method was not at all widely known or used and he felt that it made his visit to the Congress worth while just to hear Dr. Hipsley's description and results. He was also very pleased to get two other opinions on the association of appendicitis with threadworms and he would like to see some research carried out on the life history of threadworms and on tests for their presence. In reply to Dr. Williams he said that anyone who had done much chest surgery, must occasionally experience an accidental opening into the diaphragm. He had never heard of such a wholesale rupture as that which Dr. Williams had described. He had never seen any ill results from the accident. In regard to drainage he did not favour any of the more elaborate methods, such as the one suggested by Dr. Rogers. He preferred a small tube. One surgeon at the Children's Hospital, Carlton, used no tube, but applied bismuth-iodoform-paraffin paste and left the wound open.

Electrocardiography in Infants and Children.

DR. H. LAWRENCE STOKES (Melbourne) read a paper on the application of electrocardiography to infants and children. He said that in clinical work the electrocardiogram was used almost solely as a help to diagnosis. He was hopeful that with increasing knowledge it would be a definite help in prognosis as well. There were certain difficulties in applying the method to infants and children. It had been suggested that metal bands might be attached to the infant's limbs and that the leads might be taken from these. He had found the immersion method much more satisfactory. He showed several tracings which he had taken from several young patients. Among these was one from a child with dextrocardia which showed the condition to be one of true transposition. Several curves from patients with acute rheumatism suggested that when the patients were first seen there were probably multiple inflammatory foci in the heart affecting chiefly the main conducting bundle. In another was seen an auricular fibrillation in a boy, aged three years.

DR. R. A. R. GREEN (Sydney) thanked Dr. Stokes for his careful address and congratulated him on his enthusiasm and the amount of work he had done. Despite his obvious enthusiasm he had not been lead to regard electrocardiography as a panacea for their difficulties in the diagnosis and prognosis of heart disease. Some definite value could be attached to a series of electrocardiograms in, for example, acute rheumatism, especially by a further study of the *T* wave as mentioned by Dr. Stokes, from which information might be gained about the prognosis of rheumatic heart disease. His own interest in the subject arose from a consideration of diphtheritic hearts. He had built up a mental picture of the pathological process of myocarditis with consequent rapid action and occasionally an involvement of the auriculo-ventricular bundle leading to heart block with consequent slowing of the rate and irregularity. A small series of electrocardiograms had revealed an irregularity due to some interference with the origin of the impulse in the sinus region with normal cycles of contraction of the whole heart. In regard to the difficulties of taking tracings in young patients it was probable that a new portable electrocardiograph would solve some of these difficulties on account of its definite portability and rapidity and ease of adjustment without any evident sacrifice of sensitivity.

DR. M. D. SILBERBERG (Melbourne) said that the chief value of electrocardiograms was in showing changes in the excitability and contractility. In children it would be of great value in research, though it would be only occasionally a useful adjunct in clinical pædiatrics. New forms of portable apparatus were extremely convenient and easy to work. Long lengths of tracings could be taken without fear of damaging the strings and could be recorded at the bedside. This opened up a large field of research in infectious diseases, especially in reference to diphtheritic myocarditis and to the study of the heart changes during anæthesia. Dr. Stokes's patient with the varying rhythms of block and tachycardia probably illustrated changes in the neuromuscular mechanism. Some years previously a child with heart block had been admitted to the Children's Hospital, Melbourne, in a Stokes-Adams attack after having fallen against the leg of a table. He was thought to be suffering from hæmorrhage from the middle meningeal artery and trephining had been performed. The heart block had been discovered during his convalescence. The heart was very large and the condition was probably congenital.

DR. GUY SPRINGTHORPE (Melbourne) said in reference to the *T* wave that the observation in post-rheumatic hearts should be of prognostic value. He spoke of a patient under Dr. Goodall, of the Heart Hospital, London, whose serum had reacted to the Wassermann test. A very small *T* wave was observed which gradually became normal under antispecific treatment. Dr. Goodall had also attached importance to the height of the *T* wave in anginal conditions as showing evidence of the extent of the myocarditis and consequent insufficiency. Dr. Springthorpe suggested a correlation of the electrocardiographic findings after exercise with the usual exercise tolerance tests; they would thus have some method of judging whether the heart muscle was recovering after the rheumatic infection or not.

DR. N. W. MARKWELL (Brisbane) thanked Dr. Stokes for his interesting paper. He expressed the opinion that electrocardiography was not so useful in childhood as in adult heart disease. It was of the greatest value in arteriosclerosis and scleroses of the heart. It was disappointing that Dr. Stokes and Dr. Silberberg had found it of doubtful use in congenital heart disease, but Dr. Markwell thought that when doubt arose concerning a congenital heart disease the patient should be examined by means of an electrocardiogram. The main condition in which electro-

cardiograms might be useful, was the acute cardiac affection. In diphtheria if the *T* wave was inverted in either of the first two leads, it was not an absolute prognosis of fatality. In rheumatic fever death from hyperpyrexia had become exceedingly rare. The great danger apart from pericardio-mediastenitis, was some future damage to the endocardium. He believed that the heart muscle was always affected, but tended to recover. They had to watch the valves. The case described of paroxysmal auricular fibrillation may have been syphilitic. Dr. Markwell quoted a case of a child, aged twelve years, who strained her heart lifting at acrobatics. She had had a history of pneumonia and diphtheria. It had been taken for granted that these were the ætiological factors. Some months later he had found that the patient's serum reacted to the Wassermann test. The majority of the child's family had been syphilitic. Syphilitic heart disease should always be kept in mind. He had published a case of a depressed *T* wave in lead in a patient who was recovering under antisyphilitic treatment. This case was similar to that mentioned by Dr. Springthorpe. He thanked Dr. Stokes for his ideas about the rubber gloves and apron, but thought the immersion method better.

Dr. S. F. McDonald (Brisbane) said that it had given him great pleasure to listen to Dr. Stokes's paper as one of the clinicians who followed in the wake of research workers, picking up fragments of their work. In his opinion a great opening lay in two classes of patient, the rheumatic and the diphtheritic. In the former it was essentially the muscular condition which was of importance. Of two children one with apparently much damaged valves might live a long and vigorous life, while another with a scarcely dissimilar valvular lesion might become a cardiac cripple. In the diphtheritic case it was the late heart failure which came on without warning and which was associated with pallor, irregular heart beat, abdominal pain and intractable vomiting followed by death in twenty-four hours. These cases had been investigated by the late Gilbert Lamble and he had found vagal degeneration. It was interesting to hear Dr. Green say that in such cases he had found no heart block.

Dr. S. W. Ferguson (Melbourne) wished to congratulate Dr. Stokes on his admirable paper which had obviously entailed so much work. The discussion he thought had taught the uses and limitations of electrocardiography.

Dr. Stokes replying said that he wished to thank all the speakers for their remarks and their contributions to the discussion. He considered that a great deal more work should be done and that frequent serial examinations should be taken. If this was done, he was hopeful that something would be learnt to aid prognosis in rheumatic and diphtheritic hearts.

The Feeding of Infants.

Dr. H. Boyd Graham (Melbourne) referred to the guide book on infant feeding compiled by Dr. Vera Scantlebury, Director of Infant Welfare, for medical practitioners and nurses. In regard to natural feeding he found that if proper measures were instituted, breast feeding would be reestablished more frequently than was the case. In 1927-1928 only 72% of the infants under three months brought to the health centres in Victoria had been breast fed. At times adequate reasons were given, such as death of the mother, serious illness of the mother, severe harelip and cleft palate of the infant. The inadequate reasons were more numerous. The rules for natural feeding were given. They included the awakening of confidence on the part of the mother, the need for five or six regular feeds between six o'clock in the morning and ten o'clock in the evening, the necessity of emptying one breast completely at each feed, weighing the baby before and after each feed and so forth. Artificial feeding should not be resorted to without advice from a doctor. The second part of the paper was concerned with artificial feeding. Dr. Graham set up twelve principles. The best substitute for natural feeding was cow's milk, suitably collected, delivered, stored and prepared. The food should be adjusted to the caloric requirements of the infant. Five or six feedings should be given each day. The calculation of the protein, carbohydrate and fat equivalents was given. It was important to supply in addition all the vitamins in sufficient quantity. The mineral content should be studied. The feeding should follow a scale to the normal age-weight curve. Standard weights and measures should be employed. All directions should be precise and written. Dr. Graham dealt in some detail with the practical application of the twelve principles. In order to prevent the formation of tough curd in the stomach, lime water, citrate of soda or water could be added. The protein could be modified by the giving of whey and weak starch solutions or by pasteurization or bengerization. The booklet referred to contained formulæ for five basal milk mixtures. The weakest contained two parts of milk to three of water and the strongest three parts of milk and one of water. The sugars recommended were cane sugar, sugar of milk and the malt sugars. Cod liver oil emulsions or butter represented the best form of fat. Dr. Graham strongly advocated lactic acid milk for the feeding mixture. He referred to the work of Marriott and Brennemann. Evaporated milk or dried milk could be used with advantage. Guidance was given in regard to the change from one method of feeding to another. Dr. Graham pointed out that if a baby were allowed to drink as much as he cared for, he would often exceed the caloric requirements. It was wise to give additional water and to restrict the milk mixture to the needs of the infant. He pleaded for careful attention to details and a continuous supervision. There was much room for improvement in the usual methods of feeding infants.

Restoration of Breast Feeding.

Dr. Guy Springthorpe (Melbourne) read a paper on the restoration of breast feeding. He based his remarks on the records of the infant welfare centres of Victoria, at which 72% of the babies attending had been completely breast fed at the age of three months and 60% at six months. The supply of milk failed for many reasons. The failure was at times traced to faulty methods during the institution and early period of lactation; at times incorrect feeding methods had been adopted at a later date. In the third place the fact that the breast milk was beginning to decrease had not been recognized. The wrong kind of complementary feeding had been employed in some instances. Failure of breast milk might be due to illness of the mother. In chronic illnesses the special conditions had to be considered. Advanced pulmonary tuberculosis was necessarily a contraindication. Of the causes located in the breast, cracked nipples, abscess of the breast, hard muscular nipples, imperfect development or inversion of the nipples were the most common. The fault might reside in the infant. In discussing the means of restoration Dr. Springthorpe placed the psychological approach to the mother first. Regular feeding, five times each day at intervals of four hours, was essential. In the third place he spoke of the necessity of emptying the breast by hand expression after each feeding. Stimulation and massage should be carried out twice a day. He advocated suitable complementary feeding and attention to the hygiene of the mother and the baby. Dr. Springthorpe gave details of the results in the feeding of fifty infants. The weight of the infant on admission and the deficiency in calories of the breast milk were noted and compared with the percentage of the caloric requirement on discharge, the percentage rate of increase of the breast milk per day and the quantity of milk expressed calculated as a percentage of the total quantity of breast milk. The difficulties experienced in the restoration were explained. These were either maternal or infantile. In conclusion Dr. Springthorpe pointed out that it was useless to expect good results in less than ten days. Two or three weeks should be spent in the institution.

Dr. Margaret Harper (Sydney) thanked the two speakers for their very interesting papers. There were many difficulties during lactation, but she thought that most of them could be overcome. With regard to artificial feeding she agreed with Dr. Boyd Graham that the caloric requirement should be the basis of feeding and that human milk should be taken as a guide to the composition. There were twenty calories to the ounce in human milk. The

protein should amount to from 1·0% to 1·5%, the sugar to about 7%, but it might be necessary to reduce the latter. In New South Wales she found that 3·5% fat could be well tolerated if the protein could be kept low. She did not think that lactic acid whole milk was good as a continued food, but was useful in selected cases. When they reached their expected weight she considered that they should be fed with larger volumes containing approximately 20 calories to the ounce.

DR. R. A. R. GREEN (Sydney) expressed his appreciation of the enthusiasm of the two speakers in their subjects. He thought that the underlying principle in feeding was the ratio between the calories supplied by the protein and the calories supplied by the carbohydrate and fat. This should be as one to ten. He considered that the restoration of breast milk was a most important subject and one which was not nearly as widely known and appreciated as it should be. He considered that the use of the percentage of breast milk expressed as an indication as to possible results of attempts at restoration might be a fallacy, as it might be expected that the more complete emptying of the breast would be followed by an improved supply.

SIR TRUBY KING (Wellington) said that in connexion with lactic acid milk modification this had been used in some form or other for the last hundred years. He considered with regard to "Lactone Syrup" that it was unwise to recommend the use of such an expensive commercial preparation when the same result could be obtained by using glucose and lactic acid. In America commercial preparations were used to an enormous extent. He considered Dr. Springthorpe's paper an admirable summary and agreed with him entirely in his insistence upon the necessity of weighing the baby before and after feeding for accurate information as to the quantity received. The quantity of breast milk varied considerably at different times of the day, being generally greater in the morning. The fat content had also been shown to be far higher at 10 o'clock in the morning than at other times. Therefore it was necessary to analyse specimens collected over twenty-four hours in order to arrive at an accurate conclusion about the average composition. He agreed that the psychological factor was most important in breast feeding. He pointed out that Nature had made provision for the nursing of twins. Sir Truby King felt that there should be very few failures in establishing breast feeding. If sufficient encouragement were given, an adequate stimulation was assured. Marfan had said: "the secretion of milk is the response to sucking" and it was possible to stimulate the secretion of milk by this means in old women and virgins and it had been known even to occur in men. With regard to the value of massage he referred to experiments which had been carried out in America, in which cows' udders had been massaged with a resultant substantial increase in the amount of milk produced. He considered that Dr. Springthorpe had performed an excellent piece of work. He had recently visited the hospital where Dr. Springthorpe had carried out his study and would be proud to be connected with such an admirable institution.

DR. S. F. MCDONALD (Brisbane) considered that the caloric system of feeding was a danger in unskilled hands as it tended to concentrate attention on figures instead of on the baby. He would prefer to feed a baby instead of to a baby. He had found that the result of this method was usually underfeeding. With regard to the fat content he considered that excess of fat was more likely to cause digestive disturbances than anything else. In their warm weather he thought this should be diminished to 2%.

DR. J. HALLIDAY (Muswellbrook) disagreed with Dr. McDonald's objection to the caloric method. In his experience he had found that the only possible chance of getting consistent results was to work according to a definite scheme. If explicit instruction were given in writing and explained carefully, he found that any mother or nurse of average intelligence could follow the system. He was in favour of a widespread adoption of caloric feeding.

DR. W. C. PETHEBRIDGE (Sydney) thought that it was unwise to leave milk standing for the sake of procuring the top milk in a warm climate. As cod liver oil was given for its fat value as well as for its vitamin content, he suggested the advisability of mixing with it some other form of fat. He considered that the main value of lactic acid milk was its effect on the curd. He had seen some patients with vomiting of curds of a particularly rancid odour who had been immediately improved by the administration of lactic acid milk. He agreed that the psychological factor in breast feeding was important and suggested that more contact between mother and baby should be aimed at as this stimulated milk production. In private hospitals, particularly, the mother was deprived of contact with her baby. He had also seen severe *post partum* hæmorrhages controlled by putting the baby to the breast better than by injections of pituitrin.

DR. A. P. DERHAM (Melbourne) in discussing Dr. Boyd Graham's paper said that he had nothing to add to the discussion on the details of feeding, but that in the matter of general principles his experience as medical officer and superintendent of the State Children's Depôts since 1922 led him to have adopted a definite attitude in such matters. When he first assumed duty the staffing of the infants' ward was in the proportion of three partly trained nurses to thirty babies and approximately 250 babies under twelve months of age were admitted every year. In years immediately before 1922 the mortality among these babies had been as high as 40% chiefly from dietetic causes. By increasing the numbers of the staff to one nurse to every five babies and the employment of trained nurses a great improvement had been effected. The mortality gradually decreased until in 1927 only two infants had died in the institution and only three had died after transfer to the Children's Hospital suffering from acute illness. The mortality from dietetic causes was thus reduced practically to nil. This success was due not to elaborate feeding, but to constant intelligent watchfulness by trained nurses who had been taught to recognize and deal with the first sign of deviation from the normal. The slogans he had adopted in teaching nurses and mothers were: (i) safety in the milk mixture given to the baby; (ii) simplicity in the instruction given to the nurse or mother; (iii) slowness in changing the methods when all was going well and speed in taking action when an upset had occurred, however trivial. The essential factor in successful infant feeding was the ability to recognize and deal correctly with dietetic upsets at the outset, assuming that the three cardinal principles of a correct mixture being given in sufficient quantity at suitable intervals. In discussing Dr. Springthorpe's paper Dr. Derham expressed his appreciation and entire agreement with the views expressed. He referred to the suggestion made by Horner Lane, the superintendent of the Little Commonwealth Colony for Delinquent Children in England. It had been suggested that breast feeding had a psychological as well as a physiological importance for the infant. The sense of security and contentment that the babe derived from being on the breast and from physical contact with the mother was an important factor in the developing infant psychology. Premature weaning or wrong methods of weaning might determine repressions of desire in the infant and form the basis of serious emotional defect in later life and might have a bearing on some of the causes of unhappiness so common to humanity.

DR. E. H. WILLIAMS (Dunedin) said that it was the custom at the Karitane Hospital at Dunedin to engage as maids girls who had had illegitimate children. Their babies being healthy, served as normal infants for the instruction of nurses. One such girl was completely nursing her own infant and in addition she contributed to the feeding of seven other infants. As the result of this breast stimulation, both natural and artificial, the amount of breast milk had reached the unusual figure of two and a quarter litres (eighty ounces) per day. The girl with accompanying charts had been shown by him at a meeting of a medical society. Great interest had been expressed by those present in the results obtained by breast stimulation. The result of such notoriety, however, or in other words the psychological effect of encouragement, had had an unlooked for sequel. The amount subsequently had

reached three and a quarter litres (one hundred and ten ounces), but at this point interest had lapsed when it was found that the mother, not content with her previous record, had been adding water secretly to her supply.

Dr. R. W. Chambers (Melbourne) deplored the fact that infant feeding was so much overlooked in teaching hospitals, obstetric hospitals and in practice. He considered that pædiatrics and obstetrics should work hand in hand in the subject of infant feeding.

Dr. Douglas Galbraith (Melbourne) said that he wished to discuss only a few of the smaller points. In regard to the question of the addition of sugar to the milk mixture, Dr. Graham had mentioned that this should always be added before boiling and emphasis should be made on this point. Otherwise the mother would boil the milk and water, sterilize the container and then add the sugar from the family sugar basin. With regard to feeding by age, it had been shown by metabolic experiments that until a baby had fallen to less than two-thirds of its expected weight, it required as much nourishment as a normal baby. A six months old baby weighing four and a half kilograms (ten pounds) required as many calories as a six months baby weighing six and three-quarter kilograms (fifteen pounds). He found that one often had to compromise on the question of comforters, but strict instructions had to be given with regard to absolute cleanliness of this article. He was convinced that dental caries in children was initiated by the use of malt or honey on the comforter. The use of complementary feeding in private hospital often without the doctor's knowledge was not an uncommon cause of failure to establish a good breast milk supply. This was particularly the case when very sweet foods, such as condensed milk, were used.

Dr. Vera Scantlebury (Melbourne) congratulated both speakers. She thought that there should be much more instruction given to trainees and midwives both in antenatal and post-natal care with a view to lactation and infant feeding. The early days of feeding were the most important. Thorough attention should be paid to both infant and mother when there was any failure to progress and the necessary measures instituted early. She emphasized the value of the caloric method of feeding.

Dr. Stewart Ferguson, after thanking the speakers, expressed his great appreciation of the work done by Sir Truby King.

Dr. Boyd Graham in reply to the various remarks on lactic acid whole milk mixtures, said that he did not advocate any one method of feeding; the method used depended on a number of circumstances. He had found that lactic acid milk provided 1·3% protein which fulfilled Dr. Harper's requirements. In his experience results had been remarkably good in babies fed on this preparation from the time they were a few weeks old up to the age of twelve months. He considered that research work was needed on gastric acidity and its effect on infant feeding. In reply to Dr. McDonald he would emphasize that detailed instructions should be given and in writing to insure the successful carrying out of the caloric method. He said that what Dr. Derham had said illustrated the value of mothercraft hygiene. Dr. Petherbridge had misunderstood him with regard to the top milk. It was not left standing, but removed on arrival. He did not agree with the use of dummies. He would like to mention Dr. Scantlebury's interesting book which should form an interesting trophy to members of Congress.

Dr. Springthorpe in reply to Dr. Green said that it was doubtful from the cases studied whether complete emptying of the breast was followed by an improved supply. He thanked Dr. Petherbridge for his suggestion about increased contact between mother and baby. He would like to see much more instruction on this subject given to nurses and others occupied in this work.

Visit to Tresillian Mothercraft Training School.

The Pædiatric Section paid a visit to Tresillian Mothercraft Training School on Thursday, September 5. Dr. Margaret Harper gave a very interesting demonstration of excellent charts and of infants illustrating the methods of restoration of breast feeding which had been used with such success at this institution. The visitors showed great interest in the ward for premature infants, the special diet kitchen, the preparation of artificial foods and a new American breast pump.

Bone Dystrophies.

The Section of Pædiatrics combined with the Section of Orthopædics and the Section of Radiology and Medical Electricity discussed the subject of bone dystrophies.

Dr. R. B. Wade (Sydney) opened the discussion on bone dystrophies in a brief speech.

Dr. H. R. Sear (Sydney) read a paper on the bone dystrophies. He referred to the classification of Fairbanks who divided skeletal lesions into congenital developmental errors, errors in metabolism, endocrine errors and affections of unknown origin. He had included osteopetrosis, Albers-Schönberg's disease, under the heading of *osteogenesis perfecta*. Dr. Sear preferred to include it as a seperate entity under the heading of congenital developmental errors. In his paper he dealt solely with bone dystrophies coming under this heading. He thought that the lesions fell naturally into two main groups: diseases especially affecting membranous bones and diseases especially affecting long bones. Of the two conditions under the former heading, craniostenosis and *dysostosis cleido-cranialis*, the first mentioned was the commoner. In craniostenosis there was deformity which varied with the suture or sutures mainly involved. Apart from the closing of the sutures the typical radiological features were the presence of transradiant areas due to depressions in the skull caused by pressure of the cerebral convolutions and dense, prominent ridges between these depressions, a generalized filling of the skull, an alteration in the shape of the cranial fossæ and changes in the facial bones, especially about the orbit. The commonest type of this lesion was turricephaly and here the facial bones were much affected. *Dysostosis cleido-cranialis* was very rare. He had seen only one example. In the long bones the diaphyses were especially affected in two conditions, osteopsathyrosis and osteopetrosis. Osteopsathyrosis was a rare systemic disease commencing *in utero* and characterized by imperfect bone development, the fragility of the bones being responsible for the main clinical feature, repeated fractures. Dr. Sear described three groups of this condition. In osteopetrosis or Albers-Schönberg's disease it had been said that all the bones were involved. This had been the finding in three of the four cases which he had seen, but in one certain bones only had been affected. The typical feature was the extreme density of the bones, hence the term marble bone. This density was apparently due to an increase in the mineral content. This was supposed to diminish the elasticity of the bones, hence the frequent fractures. There was only one type of lesion involving the epiphyses; it was known by many names, achondroplasia, chondrodystrophia *et cetera*. Dr. Sear described in detail the radiological appearances and illustrated his remarks by skiagrams. He said that according to the type of changes in the cartilage the cases had been classified by Kaufman into three main groups: *chondrodystrophia hypoplastica* with failure of development of the cartilage; *chondrodystrophia malacia* with abnormal softening of the cartilage, and *chondrodystrophia hyperplastica* with great overdevelopment of the cartilage in all directions. The juxtaepiphyseal lesions fell into two groups, diaphyseal achalasia, also known as hereditary deforming chondrodystrophia and multiple cartilaginous exostoses, and chondrodysplasia or Ollier's disease. In diaphyseal achalasia the type of overgrowth might vary greatly. Sometimes there were almost smooth bony projections or long spurs, sometimes very large bony, extremely irregular masses like cauliflowers. The shafts themselves might alter with the presence of the growths—they might undergo considerable enlargement. Ollier's disease was characterized by irregular masses or growths of cartilage, usually localized towards the ends of the diaphyses of the long bones and usually not involving the whole circumference of the bone, but only one aspect. In this way considerable deformity was

caused, as the side of the bone which was involved, grew at a different rate from the unaffected side.

Dr. J. O'Sullivan (Melbourne) read a paper.

Dr. H. M. Hewlett (Adelaide) thanked the three speakers for their excellent contributions. He then showed some interesting skiagrams of diaphyseal achalasia and Ollier's disease (unilateral).

Dr. C. Littlejohn (Melbourne) also expressed his thanks to the speakers. He realized that the subject was of extraordinary difficulty.

SECTION OF PREVENTIVE MEDICINE AND TROPICAL HYGIENE.

The President, Dr. R. C. Everitt Atkinson (Perth) said that in opening the first session of the Section of Preventive Medicine, he wished to assure the meeting of the honour he felt had been done him in electing him President. He came from a minor isolated State, but still did not feel that they in Western Australia were out of date. They endeavoured to read and to maintain a standard of knowledge comparable to that possessed by medical men of the larger eastern States.

He felt that he had failed the section at the commencement, as he had not prepared a presidential address. However, he sometimes thought that addresses by a president were a waste of time. They usually consisted either of a recitation of the advances that had been made since the previous congress or an expression of the personal views held by the president and he felt that time would be more profitably spent in discussing the papers. He trusted that great benefit would arise from the proceedings of this section, not only to the profession, but also to the public.

Pulmonary Disease in the Mining Industry.

Dr. Keith Moore (Canberra) read a paper on pulmonary disease in the mining industry in Western Australia, Tasmania and Victoria. He explained that legislation had been introduced into Western Australia with the object of removing from the mining industry persons suffering from pulmonary tuberculosis and of paying compensation to all such persons until suitable employment was found for them elsewhere. During the first survey, 1925 to 1926, 4,067 men had been examined and of these 3,257 or 80·1% had been found to be free from industrial pulmonary disease. Of the remainer 655 or 16·1% had been found to be suffering from uncomplicated silicosis, early or advanced, 143 or 3·5% from silicosis complicated by tuberculosis and 12 or 0·3% from pulmonary tuberculosis without silicosis. Thus 155 men had been eliminated from the industry. Of the remaining 3,912 men, 1,131 had left the industry prior to the next examination and of the 2,781 remaining, 2,290 had been classed as normal in 1926. On reexamination these 2,290 men had yielded 2,244 or 98% normal, 30 or 1·3% suffering from silicosis uncomplicated, 13 or 0·5% suffering from silicosis with tuberculosis and three or 0·2% from tuberculosis only. Of the 491 who had been found in 1926 to be suffering from silicosis, in 86 or 17·5% the disease had become complicated by tuberculosis during the twelve months' interval. Dr. Moore then gave full figures for the years 1927 and 1928. He pointed out that excluding new examinees and considering those reexamined only, the percentages of those eliminated in respect of the totals for the three years were 3·8, 3·6 and 1·2. Among new applicants for employment in 1927 and 1928 the percentages had been 3·6 and 3·0 respectively. The effect of retaining in the industry those suffering from silicosis not complicated by tuberculosis was shown by the fact that tuberculosis had occurred in 0·7% and 0·5% of those regarded as normal at a previous examination and that among those regarded as suffering from silicosis the percentage of those developing tuberculosis was 5·9. These facts were of interest in view of the theory of latent silicosis of Watkins-Pitchford. The latter had considered that two factors were necessary for the development of silicosis even in its usual form, a condition of latent silicosis and an access of tuberculous infection. The acceptance of the views of Watkins-Pitchford would offer an explanation of the apparently abnormal percentage of complicated silicosis found on reexamination of normal persons. Over 60% of miners on the western coast of Tasmania had been examined. Among 455 miners who had worked underground, 27 were found to have simple silicosis (5·9%) and 14 or 3·1% to have silicosis and tuberculosis. Pulmonary tuberculosis uncomplicated by silicosis had been found in five instances or 1·1%. In one mine, of those who had worked underground for between 11 and 15 years, 22·2% had been affected. Of 191 men who had worked underground at Mount Lyell, only six or 3·1% had been found to be suffering from tuberculosis. Of 352 miners who had worked underground in Tasmania, but not in other States, 16 or 4·5% had been found to be suffering from silicosis. It thus appeared that silicosis would result from work in Tasmanian metalliferous mines, although the silicosis incidence in the North Mount Lyell mine was less than the average for Tasmanian mines generally. In regard to investigation in Bendigo, Dr. Moore referred to an investigation made in 1920 by the late D. G. Robertson. He pointed out that the findings had not been checked by radiography. In 1922 136 miners had been examined clinically and radiologically and 60% had been found to be suffering from industrial pulmonary disease. The number of men examined, however, had been only about one-third of those employed underground. In 1928 another attempt had been made to examine the Bendigo miners, but since only 38% had been induced to volunteer for examination, no hard and fast conclusions could be drawn. Dr. Moore pointed out that he had used the term silicosis to denote industrial pulmonary fibrosis and he referred to the conclusion of Dr. Badham that this term should be confined to fibrosis caused by free silica or quartz. Dr. Badham had suggested the term silicatosis when the condition was caused by combined silica.

Dr. R. C. E. Atkinson (Perth) said that Dr. Moore's paper showed how the Commonwealth Government had been working in the investigation and the prevention of disease in mines. The Western Australian Government had been greatly assisted by the Commonwealth Government in the administration of an act designed to prohibit sufferers from pulmonary tuberculosis from working in mines. One of the difficulties arising from the enforcement of the act had been in finding suitable occupation for the men who had been thrown out of employment. These men were frequently found to be unfit for any laborious work and had to be placed on a full pension.

Dr. J. H. L. Cumpston (Canberra) confessed that he had not touched on this type of work for many years. In Western Australia several years before he had exposed guinea-pigs and rabbits to dust and had found very definite inflammatory changes in the lungs. These changes might have been regarded as prefibrotic. In the lung of a rat caught in a Western Australian mine definite fibrotic changes similar to those seen in the human silicotic lung had been found. He did not consider that anyone would believe that this rat had been affected with latent tuberculosis as suggested by the workers in South Africa. The lung of a bootblack who had been working in the region of the dumps in Kalgoorlie, had been examined. It had been found to contain fibrotic changes round the bronchioles and arterioles. He and his collaborators had belief that the deposition of silica occurred in the region of the bronchioles and arterioles and sometimes beneath the pleura. Another rat examined had been found to be affected with subpleural nodules which on microscopical examination had proved to be fibrotic in character. Dr. Cumpston asked at what stage in the life of a man affected with silicosis did he cease to be normal and become definitely silicotic. What were the clinical criteria in this condition? This appeared to be the principal difficulty in the investigation of silicosis.

Dr. H. G. Chapman (Sydney) expressed the opinion that a person with simple silicosis, immediately the diagnosis was made, should be regarded as susceptible to tuberculosis and removed from the mines. He did not believe that a weekly pension should be given to these men, as it had been found that many of them were capable of work. Few of them were not content to live on their pension without working. They should be given a lump sum

commensurate with the length of time they had been at work in the mine. They were then more likely to seek fresh employment and were provided with sufficient money to enable them to obtain it. It was possible to ascertain approximately to what extent a man with advanced silicosis had lost his capacity for work. Some young men thus affected had little incapacity and were fit for work and did not require compensation; such young men did not usually become worse, but it had been found that after a period of some ten to fifteen years they were apt to develope some cardiac incapacity. Of the fifteen men who went to Griffith from Broken Hill, seven had died in a period of seven years from cardiac failure. Older men with some degree of incapacity usually went downhill. About one-third of silicotics in Broken Hill in 1920 later had become affected with tuberculosis; one-half of these had died quickly; the other half had not died rapidly, nor had the disease advanced rapidly. Thirty out of one hundred and fifty were still alive.

DR. H. B. BARET (Sydney) did not believe that latent tuberculosis was required for the development of silicosis. He pointed out that the apices in silicosis often remain free for a long time. Dr. Baret then read the following extracts from a paper by Dr. Charles Badham which had appeared in the Report of the Director-General of Public Health of New South Wales for the year 1927.

It is my intention in this paper to consider the ætiology of the fine fibrosis of the lungs which is not uncommonly found in the metalliferous and coal miners and some workers in other industrial activities in New South Wales.

This type of fibrosis is found only after exposure to certain mineral dusts and it can in most cases reasonably be assumed to be caused by various silicates. It is not found in workers who have only been engaged in activities where they are exposed to a high percentage of quartz (*i.e.*, 70-90 per cent.) such as workers in Sydney sandstone. I call this condition silicatosis to distinguish it from the well-known and sharply defined silicosis, which is a coarse nodular fibrosis. The terminology of dust diseases of the lungs used by various authors at the present time is as follows:

Siderosis: A term applied to a fibrosis of the lungs found in metal workers. The condition is ill defined. Lungs are yellow or red from metallic oxides, generally of iron.

I suggest that where it is possible to identify the dust responsible, a pneumonokoniosis should be styled "silicosis" only when due to free silica or quartz and presenting the characteristic radiographic appearance; or "silicatosis" when it presents the characteristic radiographic appearance and is the result of exposure to silicates. Where both types of fibrosis occur in the one lung the term "siliconosis" might be used or the disease called a fibrous pneumonokoniosis of a mixed type. At the present time there is seen a practice of grouping all fibroses of the lung together as silicosis; as typical examples of this one might cite a recent and excellent report on the Western Australian miners by Dr. Nelson and the recent work by Pancoast and Pendergrass.

Probably the radiological technique of earlier workers explains in part the wide acceptance of this view for radiographs taken at a short distance and with broad focus tubes did not stress the difference between the fine fibrosis of dusts other than silica, and the nodular fibrosis of quartz dust. Moreover, the coarse fibrosis of silica gave clear interspaces of normal lung while the fine fibrosis presented a uniform granular mottling leading to the conclusion which is probably erroneous, that the actual development of fibrous tissue was greater in a nodular fibrosis as silicosis than in a generalized fine fibrosis caused by silicates. To me it appears that the mechanical damage to the lung is greater in a fine fibrosis than in a coarse fibrosis when both are well developed.

The special character of the X ray photograph of the Broken Hill pneumonokotic is due to the nature of the dust inhaled by the miners. This dust contains little quartz, probably it did not average 10% and much silicate. The silicate chiefly present was the mineral rhodonite, a silicate of iron and manganese. The disease at Broken Hill is a fibrous pneumonokoniosis of a mixed type. Radiographically it shows a fine and a coarse type of fibrosis, the product of silica and of silicates. It is easy to distinguish the radiograph of a Broken Hill case from one of quartz only or of a silicate such as basalt.

Fine Fibrosis Resulting from Exposure to Orthoclase Basalt.

Early in 1925 I examined a man, aged 61, who had worked for 25 years in a crusher house and had only been exposed to the dust of orthoclase basalt which contains no free silica. He had worked at farming and then in a quarry attached to the crusher house. I reported this man (thanks to the aid of Dr. W. A. Edwards, radiographer) as showing an early stage of fibrosis of the pneumonokotic type.

Owing to the fine character of the fibrosis we did not consider the stage present as an advanced one, for we had not learned to attach as much importance to generalized fine fibrosis as we did to the discrete nodular fibrosis of quartz, until we saw other examples of this condition in men employed in metalliferous and coal mines. This orthoclase basalt worker was destined to die within two years. I failed to get further radiographs or a pathological examination.

Fibrous Pneumonokoniosis in Coal Miners in New South Wales.

The fibrous pneumonokoniosis which is met with among coal miners in New South Wales and which probably occurs more often on the south than on the north coast, is typically a fine type of fibrosis which, in my opinion, is evidence that it is caused by silicates. I have, however, seen radiographs of coal miners which showed a mixed type of fibrosis, and found that such men had a history of shaft sinking or driving in sandstone measures which are not uncommonly associated with our coal measures.

Analysis of a coal dust from the south coast which may be regarded as typical of the majority of the coal dusts of that region, showed that there was present 13% of silicates and 1% of silica.

The association of tuberculosis with this condition of fine fibrosis in our coal miners does not occur as frequently as it does with a fibrosis resulting from sandstone dust. Judging by the number of cases which have been revealed during the past two years one may surmise that there is an appreciable incidence of such disease among our coal miners. Of the pathology of this condition I have no knowledge—the opportunities for obtaining lungs for examination have yet to occur—but as this disease is compensable (*sic*) it should be possible in the future to study this condition *post mortem*. The radiographs suggest a dense, very evenly distributed fibrosis.

This year Collis and Gilchrist have published an article of considerable interest dealing with the effects of dust upon coal trimmers. Writing about the radiographs of cases they say: "The impression gathered from examining these radiographs is similar to, if not identical with that obtained from examining radiographs of men exposed to a recognized silica dust risk and belonging to an occupational group with an excessive mortality from phthisis."

Fine Fibrosis of the Lungs of Cobar Miners.

Among the radiographs of our sandstone miners we frequently find examples of a fine fibrosis of the lungs of men who worked for some years at the now defunct Great Cobar Mine.

I relate this fibrosis to exposure to the dust of the ore lode which was a cupriferous pyrrhotite. This mineral is a magnetic pyrites, containing 2·5% of copper.

Cronin concludes: "These deductions are given additional weight by comparison with pathologic research. Clinically the results of hematite inhalation do not resemble those of silica inhalation, but present a unique picture, while the sections obtained by Sir

Kenneth Goadby from the lungs of an ironstone miner clearly indicated not only the presence of a considerable amount of iron as shown by differential staining, but also a fibrosis which was essentially general throughout the lungs, finer and quite opposed to the nodular whorled masses of the silicotic lung."

I have seen one case of cement pneumonokoniosis in New South Wales; it was a fine type of fibrosis.

Summary.

The ætiology is discussed of the fine fibrosis of the lungs which is not uncommonly found in metalliferous and coal miners and some workers in other industrial activities in New South Wales.

It is considered that this fine type of fibrosis can in most cases reasonably be assumed to be caused by various silicates.

The term "silicatosis" is suggested for the fine fibrosis caused by silicates and the term "siliconosis" for a fibrous pneumonokoniosis of a mixed type.

The type of fibrosis is considered in workers exposed to orthoclase basalt, coal miners, copper miners and miners in Broken Hill, Western Australia and Tasmania; iron miners, asbestos and cement workers.

DR. H. W. PALMER (Waterfall) called attention to the fact that the South African workers had based their diagnosis of latent tuberculosis on skin tuberculin tests. These tests were fallible and did not necessarily indicate the presence of tuberculosis.

DR. E. S. STOKES (Sydney) expressed the opinion that the relation between silicosis and tuberculosis was an important one which had not been cleared up. Haldane had contended that silicates did not cause fibrosis. He had even backed his opinion to the extent of recommending the dissemination of silica dust in coal mines for the purpose of preventing explosions. Dr. Stokes asked what evidence there was to connect the X ray picture with the actual condition in the lung itself.

DR. W. A. EDWARDS (Sydney) said that the degree of fibrosis and the size of the nodules as seen in the skiagrams seemed to depend on the concentration of silica in the dust inhaled. The greater the relative amount of silica in the dust, the larger would be the nodules. The snow storm effect was very seldom seen; he thought this was due rather to the difference in radiographic technique. Many miners in whom no damage to the lung field could be detected by radiological examination, were observed to have small glands, not matted together. This might bear some relation to the degree of susceptibility of the individual to silicosis.

DR. J. DALE (Melbourne) suggested the possibility of susceptibility to dust in individuals. Many men exposed over long periods to the action of dust did not become silicotics. He asked whether when the X ray picture indicated silicosis, the patients were still able to pass clinical tests.

DR. KENNETH SMITH (Sydney) was concerned with silicosis and tuberculosis in common with the granting and continuation of war pensions. He quoted two instances of snow storm appearance in the lung without any apparent abnormal clinical findings and without any apparent disability.

Tuberculosis Contacts.

DR. J. BELL FERGUSON and DR. H. MAXWELL JAMES (Melbourne) described in some detail the method adopted in the tuberculosis bureau in Melbourne in regard to the examination of persons who had come into contact with patients suffering from tuberculosis. While it was recognized that every person who had come into contact with the patient, should be examined, in practice it had been found that this ideal was unattainable. An endeavour was made to ascertain who had been exposed to infection and to have these persons examined either by their own medical attendants or in the case of poor people by medical officers of the department. The nurses attached to the bureau also used their influence to bring contacts within the scheme. It appeared that in Melbourne in the years 1927, 1928 and portion of 1929 741 persons who had had intimate association with those who were known to be suffering from pulmonary tuberculosis, had been examined. Of these 10·2% had been found to be infected, while a further 16·3% had signs or symptoms suspicious of a tuberculous infection. In other countries it had been found that approximately 12% of the contacts were infected. When a contact was found to be infected, the machinery of the bureau was put into motion in order that effective treatment and control might be adopted. Those in whom infection was suspected, were kept under observation. The control was not limited to contacts of patients with pulmonary tuberculosis. It was extended as far as possible to the contacts of patients with other forms. The authors gave an account of some of the inquiries to illustrate the value of the examination. The diagnosis of infection was based on careful consideration of every sign, symptom and biological reaction. They discussed the significance of Koch's phenomenon, that skin and subcutaneous tissue of an animal infected for a second time with tubercle bacilli reacted differently to the tissues of an animal infected for the first time. Clinical tuberculosis was an allergic process which in its earliest stages gave rise to symptoms but few signs. The history and anamnesis were important. In regard to the physical signs, they mentioned as valuable, dulness to light percussion, the detection of Krönig's isthmus of resonance, the detection of tubercle bacilli in the sputum and fæces, the harshness of the breath sound in the nipple region and in the axillæ, the presence of an egg-shaped area of dulness between the third and fourth dorsal vertebræ, the appearance of *zones d'alarme*, areas of dilated venules on either side of the upper dorsal vertebræ and skiagraphic evidence. They pointed out that not infrequently radiological examination failed to reveal evidence, even when the process was well established. They employed injections of tuberculin when the diagnosis could not be proved from the signs and symptoms. For children they fixed the first dose at 0·0001 cubic centimetre and for adults 0·0005 cubic centimetre. The test should not be used soon after an attack of hæmoptysis, in the presence of myocardial disease, renal disease, hysteria or epilepsy. In conclusion they discussed the nature of the tuberculous diathesis and the effect of infection on the digestive, the respiratory, the circulatory and the nervous systems, on the glands of internal secretion and on metabolism.

DR. HARVEY SUTTON (Sydney) said that a list of school children contacts was sent by the Tuberculosis Bureau to the medical officer of the Education Department and that these contacts were specially examined by the school medical officer on his visit to the schools. This meant that all the poorer children of tuberculous parents were examined. It had been found that though little actual tuberculosis was revealed, malnutrition was frequently seen. It was recognized that infants were very liable to infection by tubercle bacillus. Valuable work was being done in France with the use of *bacille* Calmette-Guérin in the immunization of infants. Every child should be examined radiographically. The clinical signs should not be neglected; the mobility of the chest wall was perhaps the most important feature to be observed at the examination. It appeared to him that the control of contacts was more one of hygiene than clinical control. It was highly desirable to extend the system of visiting nurses, so that the teaching of health and hygiene in the home could be furthered. If this were not done, it appeared to him that much progress would not be made. His recent experiences abroad had forced him to recognize that in Australia sufficient use of the visiting nurse was not made. He strongly advocated the use of open air schools. Closer cooperation between the general practitioner and the bureau was necessary. The practitioner should be taught to realize that a visiting nurse could help him in his work. Half of the infections in school children could be found to arise in the home. The greatest incidence of tuberculosis took place in people between the ages of fifteen and thirty years. It was therefore evident that the periodical examination of children and the instruction in hygiene in the home were of great value. Many practitioners appeared to hold the view that some people had a susceptibility to tuberculosis and would eventually contract the disease. If that view were true, it was a remarkable thing that tuberculosis had been reduced to such a great extent.

Dr. H. W. Palmer (Waterfall) said that there were two types of outside practitioner. First of all there was the lodge doctor who did not receive a fee. He could hand over his tuberculous patients to the bureau where the official would see that they were properly attended. The doctor who received a fee, should be controlled in some way in order that it might be possible to insure that he gave proper attention to the tuberculous patients and contacts under his care. Very often the doctor outside failed to carry out his duties properly in regard to tuberculosis. He had recently collected figures following on the investigation of tuberculosis during a period of twenty years at the Waterfall Sanatorium.

Only tuberculous patients were included and all readmissions were excluded. The total number of individual patients was 8,226, being 5,614 males and 2,612 females. Of the female patients 1,243 or 48% were married, while 2,753 or 49% of the male patients were married. The main object in making this examination was to find out what was the most likely period of life at which tuberculous infection took place. The history of each patient had been investigated and the disease considered to have started on the earliest occurrence of suggestive symptoms. In every instance the time that had elapsed from the appearance of the earliest symptom until the time of admission to Waterfall had been deducted from the age of the patient when admitted and the resulting age taken as the age at the time of infection. Owing to the generally accepted idea that children were specially susceptible or that infection occurred in childhood, the period from one to nineteen years was divided into four periods.

Table showing the Age Periods when Infection took place, and the Number of Male and Female Persons Infected in Each Period.

Sex of Patient.	1 to 9 Years.	10 to 15 Years.	16 to 19 Years.	20 to 29 Years.	30 to 39 Years.	40 to 49 Years.	50 to 59 Years.	Over 59 Years.
Male..	61	110	273	1,400	1,522	1,259	732	307
Female	66	134	308	976	674	303	112	39

In only 8·5% of the patients was a definite tuberculous family history obtained. In the majority of the remainder other conditions were blamed.

Table showing the Relative Incidence of Infection among the Different Members of the Families giving a Definite Tuberculous Family History.

Members in Family Infected.	Patients.	
	Females.	Males.
	%	%
Mother	21·4	10·8
Father	8·2	14·8
Sister	17	9
Brother	8·5	27·2
Mother and father	2·3	2·5
Mother, father, brother and sister	2·5	1·8
Brother and sister	3·1	4
Father and brother	1·7	4
Mother and brother	0·6	1
Mother and sister	2·5	1·5
Father and sister	0·9	2·3
Mother, brother and sister	4·3	0·2
Father, brother and sister	0·3	0·2
Husband or wife	7·4	8·1
Husband or wife, with son	1·2	1·8
Husband or wife, with daughter	3·4	0·4
Daughter	5	1·8
Son	1·7	1·8
Other members of family	8	6·8

Dr. J. S. Purdy (Sydney) referred to the crowding of people in flats and small tenements in relation to tuberculosis. The profession should take this matter up and teach the public the danger of living in overcrowded conditions. At the last congress he had shown a map of Sydney to illustrate the fact that where population was thickest, the incidence of tuberculosis was highest. It could be said that this was due to the fact that such areas were occupied by the poorer classes, but he thought that the modern tendency to overcrowding in all classes was a big factor. At a meeting of the Board of the National Association for the Prevention and Cure of Consumption, a representative of the Women's Hospital had protested against the establishment of a tuberculosis clinic at Albion Street, saying that contact with a single tubercle bacillus was all that was necessary for the development of tuberculosis. Dr. Purdy thought that the modern idea was to the effect that massive doses or small doses over long periods were necessary for the development of tuberculosis, not the casual contact with a single bacillus. He emphasized the necessity for the construction of schools on the open air principle.

Dr. H. B. Baret (Sydney) stated that the visiting sister attached to the Tuberculosis Bureau was taught to go to the houses occupied by tuberculous people not only to discover the contact, but also to instruct in the ways in which help could be obtained from the various charitable institutions. The nurses were looked upon as actual aids to the family. The rest of their work was of secondary consideration. He did not think that the question of heredity was involved; the question was one of infection.

Of a total of 1,136 patients questioned, 457 had tuberculosis in the family, a proportion of 40%. These 457 patients had 571 infected relatives, which corresponded to about 1·5 infected persons per patient or an average including the patient of 2·5 tuberculous persons per family. The principal incidence of tuberculous infection was in the family composed of father, mother, brothers, sisters and children. These comprised 513 out of the total number of 671 infected relatives. This would seem to indicate that the closer the relationship, the greater the risk of infection.

Out of a total of 224 married patients, 37 had partners affected, a proportion of 16%. The wives of fifteen of one hundred married men were also affected, or 15%. The husbands of twenty-two of one hundred and twenty-four married women or 17% were also affected.

Dr. R. T. Michell (Sydney) agreed with the dictum that contact was far more important than heredity. The family history was of little value save in so far as it indicated the probability of contact. Among the poor tuberculosis ran in families and these were generally people of poor nutrition and hence more easily infected. In many families in which several children were infected, there was no history of tuberculosis in either of the parents. He thought that there was a very large number of exceptions to the rule that pleurisy was always tuberculous in character. Even hæmoptysis did not necessarily indicate pulmonary tuberculosis. He thought that many of these patients had bronchiectasis with a surrounding area of broncho-pneumonia. He quoted the case of a patient whom he had recently attended, whose parents both gave history of tuberculosis and who was found by radiographic examinations to be suffering from bronchiectasis.

Dr. J. Sinclair (Wentworth Falls) said that he thought the *bacille* Calmette-Guérin might go a long way towards the solution of the problem of tuberculosis. Its use might effect a great economic saving by rendering unnecessary the construction and maintenance of many sanatoria and like institutions. Some people had objected to the use of live bacteria, but recently it had been shown that good results could be obtained by the injection of dead bacilli. In Papworth Tuberculosis Colony four hundred children had been born of tuberculous parents. Not one of these children had become infected with tuberculosis. The children were still living with their parents, but the conditions were ideal.

(To be continued.)

Corrigendum.

Our attention has been drawn to two errors in the article on the estimation of total chlorides in tissues by Miss Winifred Mankin, M.Sc., published in the issue of September 14, 1929. On page 361, in the paragraph beginning with the word "Applying," the reference should be to Table I and not to Table VI as indicated. On page 362 in the letterpress following Table IV the figure in parentheses should read 0·9638 milligramme.